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Transactions of the Australasian Medical Congress (British Medical Association)

Second Session: Dunedin, February 3 to 10, 1927



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SECTION VIII.—NEUROLOGY AND PSYCHIATRY.

THE SOCIAL ASPECT OF MENTAL DISORDER.

By S. A. MOORE, M.D. (Edinburgh),
M.R.C.P. (London),
Dunedin.

(Continued from page 288.)

In New Zealand there is also an elaborately equipped psychopathic hospital at Hanmer.

The above suggestion would be a reversal of the policy which has been pursued in the past, but today not only in the case of industrial schools and gaols, but also in the case of mental hospitals and tuberculosis hospitals proximity and ready access to modern apparatus, laboratories and the specialist staffs of the large centres are so desirable that a powerful argument against placing such institutions in isolated places has arisen.

If the University training is inaugurated, a great impetus should be given to the research in this field which is so strongly indicated.

Lastly I would like to emphasize the need for an active educational general propaganda which should consist of single lectures where no more could be done, but preferably of short courses of lectures to clubs and other institutions for women and for men. The public needs instruction as to the possibilities of modern treatment and as to when it should seek advice. It is not known that difficult and problem children and young people have open to them today a treatment. It has been shown that a child who has bad habits, is destructive or a thief, can often be handled not only with success, but also in a manner that the imperfect form of inhibition repression with its tendency to return later in symbolic guise or in its unadorned original form may be removed. Much information can be given to parents that would enable them to solve their difficulties in training children and in vocational guidance.

It may be asked: Will the public help? There is no doubt of the answer. There is widespread, intense interest and active sympathy with this work. What work could be more fascinating, what study more absorbing than the control of the mind. There

is a readiness to help, if it can only be shown what to do and how to do it. Not only church people but the general public in Invercargill has made a noble response to a request to stand behind the Borstal Institution there. Many teachers are keenly anxious to devote themselves to mental deficiency work. The Church has always in time past gained great honour by the care it has given to sufferers shunned by humanity. In the field of physical disease it has won laurels because in this it allied itself to science. In delinquency and in much mental disorder it has failed in the past, but it can gain new life and win fresh victories today if combining with mental science it will again attack the problem of those who are today the despised and rejected of men.

Conclusion.

Segregation and sterilization can act only as a palliative. The problem can be tackled only by a mental hygiene movement in which the mental factor as well as the physical factor is recognized. The cooperation of the whole community is needed in an effort to raise the standard of mental health and of civilization of the whole community and the community, if shown how, is ready to do its part.

A national council for mental hygiene should be created.

Education of the whole community should be given by University training of the liberal professions, particularly of medical students and a proper school of social science should be established to train teachers for mental defectives and other social workers.

If the education board is to be in charge of any class of mental defectives, it must avail itself of psychiatric diagnosis and advice. Physical even combined with non-medical psychological diagnosis is not enough.

A reasonable aim for us to adopt is to endeavour to do for mental deficiency and juvenile delinquency in New Zealand what has been done for infantile mortality. If the public realized the need which exists, public benefactions to the extent of ten or twenty thousand pounds to the University would be readily forthcoming in order to found a psychopathic hospital and a school of social science in the University. A professor of psychiatry would then of necessity be appointed.

THE UNIVERSITY TEACHING OF PSYCHIATRY.

By C. A. Hogg, M.B., M.S. (Edinburgh),
Inspector-General of Insane,
New South Wales.

HAVING acceded to a request that I should write a short paper on the university teaching of psychiatry with a view to eliciting criticism which may be and doubtless will be of a helpful and constructive nature, I find myself in somewhat of a difficulty as to how to approach the subject.

It has to be borne in mind and of this fact I am fully aware that under present conditions of university education it would, perhaps, be difficult to put into practice the suggestions made in regard to the education in psychiatry of the medical student while undergoing his course of training for acquiring his ordinary medical degree.

It is realized that the student is already thought by many to be overburdened with lectures, demonstrations and practical work and that perhaps it might be neither advisable nor practicable to make any further additions to his course. I mention this in advance because it must be admitted and also in order to anticipate such destructive criticism as I know will be forthcoming in regard to these suggestions. Nevertheless it is possible to coordinate a considerable amount of the student's lectures, so that if emphasis is placed on these lectures as regards their bearing on both neurology and psychiatry, it would be possible for the student to keep them on one side and as he already has to master them to pay special attention to them as regards their relation to this particular subject. This undoubtedly would relieve the teachers of the necessity of going over a great part of this work again during the course for the diploma of psychiatry, as it has been found necessary in the past to retrace much of this work of which the student should and probably would have been master, had the importance of its bearing on neurology and psychiatry been pointed out to him at the time. In this respect I may refer to certain parts of physiology, some of which was redelivered in the course of psychiatry and which I find is even now being delivered to the second year medical student. This is exemplified by muscle, nerve preparations and the like. The same applies also to the anatomy of the nervous system and might be even extended to gross and microscopical pathology of the nervous system. Moreover, in chemistry and physiological chemistry many things are taught to the students, which in these courses as well as the others might possibly be coordinated, forming a series of lectures which it might be pointed out would in the future have a direct bearing upon the neurological and psychiatric training.

Having by these remarks pointed out the difficulties which, as I am only too well aware, stand in the way of a scheme that might be considered a partly ideal suggestion for the university teaching of psychiatry, I shall take the liberty of prefacing my suggestions with a few introductory remarks. I am hopeful that this paper will provoke some

destructive criticism and more especially some of a constructive nature.

I may point out also that in the University of Toronto, for whose calendar I recently sent, during the second year of the student's career sixty lectures in psychology are delivered as an optional course, during the third year about forty hours' laboratory work and during the fourth, fifth and sixth years fifty lectures on psychiatry are provided.

The Importance of a Thorough Training in Psychiatry
for the Study of the Infant Child
and Adolescent.

A thorough training in psychiatry should, I think, include such subjects as will enable the school medical officer and the general practitioner to detect deviations from the normal in the growing infant and child, so that they may advise in such a way as to prevent these variations in an early stage by suitable changes in the unfavourable environment and training. This would necessitate a knowledge and skilful study of the parents, of the school environment and associates and a timely correction of unfavourable factors might be the means of averting the necessity in later years for treatment by a psychiatrist either at a psychiatric clinic or in the wards of a general or mental hospital. The mental hygiene of childhood in children of preschool age and of early school years is of prime importance and herein would lie the value of training in psychiatry those medical officers who are engaged in the work of education departments. It would enable them to hand on such of their knowledge as could be assimilated to the teachers themselves. It must be admitted that if the child is reached while it is young, much can be done to aid the personality to develop in the right direction by eliminating at the very earliest appearance faulty habits and reactions and by fostering right attitudes and reactions. Even if qualities that go to make up personality are regarded as innate and unchangeable, it is well known that on the practical side it is possible to change the manifestations of personality in the behaviour. Training in psychiatry is also of value in public mental hygiene in that it includes advice on and knowledge of the proper training and education of defective children and the selection of an appropriate occupation for persons with tainted inheritance. The importance to the school medical officer, the general practitioner and the police and gaol surgeons of being able to recognize the early manifestations of constitutional immorality cannot be too strongly stressed, as the symptoms of future pathological deviations may begin at an early age. The value of teaching in psychiatry being extended by general practitioners, school medical officers and other medical practitioners, does not admit of any dispute.

The Present Disadvantages to the Community Owing
to the Absence of Sufficient Systematic
Training in Psychiatry.

Many general practitioners having had no opportunity of gaining knowledge of the manifestations and treatment of mental disorders and delinquency in their early stages, fail to recognize the serious-

ness of the condition and, therefore, to secure for their patients efficient and early treatment. The general practitioner has not been able to do much in the way of mental treatment owing principally to this lack of training and also to the great amount of his time which would be taken up in going deeply into these cases. The latter disadvantage will probably always exist to a greater or less degree, but the former can and I feel sure will be remedied by the inclusion of training not only in psychiatry, but also in psychology in the student's university course. It will be conceded I think without contradiction that any great step towards advancement in the proper treatment of early cases of mental and nervous troubles makes it necessary that the general practitioner must be acquainted with the symptoms of these conditions and conversant with their proper treatment. It is, therefore, essential that a teaching and training at the university should deal primarily with the signs of early mental and nerve trouble as well as mental deficiency.

Most general practitioners seem to regard mental disorders as quite outside their ambit. Owing to lack of experience not only in the treatment, but also in the diagnosis, they do not realize the importance of early and special advice in the individual case, although they are quite ready to hand over the patient to a specialist for advice and treatment. The general practitioner while in attendance on one member of the family often has the opportunity of observing other members of the family up to that time regarded as sound in mental and bodily health; he would be able if trained to study and appreciate as causative factors the temperament, the mental make up and the behaviour of those members of the family under whose influence the patient has been in early childhood and would be able to estimate the influence of imitation on the symptoms. If trained in psychiatry including psychology and neurology, he would be able to recognize and record interesting traits, temperamental peculiarities, emotional instability, aptitudes or absence of them and such things as teachability, sociability, pathological lying and causes of truancy. The value of this knowledge to the specialist and to the medical superintendents of hospitals to which the patient may afterwards be sent, would be great, because if encouraged and trained to be systematic in making and recording these observations fully, the medical practitioner could be of service in supplementing our present knowledge in regard to the earliest stages of mental disorder, in that as a general practitioner his profession would bring him into the most intimate and confidential relations with the social life of the people, as individuals, as members of the family and as members of the community. If he should have the advantage of the assistance of a social service visitor, he might be able to give many hints which by putting the specialist on the track of events and symptoms, apparently insignificant at the time and forgotten by the patient, would be invaluable in the application of treatment by either suggestion, persuasion, reeducation or psychoanalysis, as the case may be. It would be of great

value also to the medical superintendent of a mental hospital if the general practitioner, as a result of this training, were able to send a full and detailed account of the patient's symptoms from their earliest beginnings and with such a training I submit this would be possible and would be of great advantage not only to the patient, but to the medical superintendent. The result of emphasis placed on this training should be that his (the medical practitioner's) efforts would be directed not only towards saving his patient from becoming certifiably insane, but also towards correcting any irresponsible attitude, any lack of conscientiousness, any want of appreciation of the rights of others, any disregard to the usual standards of social and economic fitness, any inability to adapt themselves to life so as to become efficient in an industrial and economic way. It will be admitted that to be taught the well recognized symptoms of confirmed and perhaps advanced mental diseases is not nearly of such great value to the community and to the individual as a knowledge which may be of value in the prevention and anticipation of possible deviations from health.

It seems needless to stress further the advantage of wider knowledge in such things as backward children and their training, delinquents, the relationship of crime to insanity, but all these have their importance which is by no means a small one. I submit, therefore, that these few introductory remarks have been sufficient, perhaps, to convince you that the subject of university teaching of psychiatry is one which is well worth serious consideration, and from the discussion it is to be hoped that suggestions of definite value may be forthcoming. The field is become an extensive one and the amount of knowledge of the varied branches which seem to be required, makes it a very large and important subject.

At a meeting in America held quite recently some of the leading specialists discussed the question of the extent of the training of a candidate for a diploma in psychiatry. The following suggestion was made by one of the leading men and was both seriously received and discussed. I quote it for you; it was this:

That the candidate should first do a two years' preliminary scientific course during which he would be required to take psychology theoretical and practical and other allied scientific subjects. He would then enter on a four years' medical course from which it was recommended that surgery and obstetrics should be omitted. After this it was suggested that he should spend one year at least as a physician in the wards of a general hospital. He should then spend another year in the wards of a mental hospital, another year should be spent on clinical work and then it was considered that another two years would be of advantage.

This seems, perhaps, rather an exaggerated view of the necessities, but if even approximately true, I venture to suggest that the quantity is not excessive. I think it will be conceded that ten years' practical and clinical experience in the wards of a mental hospital is necessary before one can put forward any well founded claim to special knowledge. I have no doubt that some will disagree with this statement and I venture to suggest also that neuro-

logists would make with justification the same claim for their branch.

With these few introductory remarks I shall proceed to what might be considered an ideal, although admittedly not the best ideal to be aimed at in the university teaching of psychiatry. In view of the fact that this has to be approached from two points of view, the training of students generally so that as general practitioners they may be more conversant with special knowledge and secondly the training as graduates of those who are desirous of proceeding to the acquisition of the diploma, my remarks will be submitted under these two headings. I think that the university teaching of psychiatry to students before graduation would be of value not only from the point of view of the student, but also if this course could be attached to the various courses mentioned below, it might be possible to examine the students during the course and to regard it as a preliminary examination for the diploma of psychiatry to be followed after graduation by a two years' special course. The importance of psychiatric training for the body of medical students from whom will be drawn the future general practitioner, and upon whom will fall the duty of recognizing mental variations in their early stages, will be admitted and, therefore, amongst other things the teaching should include better facilities for the study of psychological medicine, especially of incipient cases of mental and nervous diseases.

Firstly, the course necessary for students. It would be preferable if this could be taken along with his other medical studies; the course must be distinguished from the more advanced post-graduate course for which a duration of two years is suggested, this course and the passing of an examination on its completion would be prescribed for the diploma in psychiatry. The advantage of spreading the knowledge especially of early cases and their symptoms beyond the confines of both the psychiatric clinic and the mental hospitals themselves will obviously be a benefit to the health and well-being as a community. This should be the primary and main factor governing the arrangement of not only a teaching, but what is of even more importance, of the training class in psychiatry. The course of the student should be so arranged that it will serve as a foundation for the more advanced course and the latter should not be a mere repetition or a mere enlargement of the courses delivered before graduation. The teaching of psychiatry should be approached from several points of view: the clinical and the systematic lecture course and in the case of the candidates for the diploma, the pathological, the experimental and the laboratory courses. It seems necessary that any intelligent approach to the understanding of abnormalities in the mind should be preceded by a study of normal psychology combined with a laboratory training. In connexion with this the method pursued at the University of Toronto, where the medical course is one of six years, seems to have much to commend it. There the course of lectures in normal psychology is delivered in the second year of the students' career

and consists of sixty lectures on normal psychology. This is described as optional, but it would be a great advantage if it could be made compulsory. The passing of an examination in this course should be made compulsory for those who have any intention in the future of qualifying for the diploma of psychiatric medicine after graduation, and would thus really become a preliminary part of the qualification for that diploma. During the third year a practical laboratory course is given in psychology and this consists of about thirty hours' laboratory work.

Students' Course.

Psychology.

I should, therefore, suggest a course of sixty lectures in elementary psychology for the student, together with the laboratory course consisting of at least ten lectures of mental tests and twenty hours of practical work.

Physiology.

During the second and third years in the physiology course a course of ten or more lectures on the physiology of a nervous system, having special reference to the needs of psychiatry, might easily be incorporated with the systematic lectures on the physiology of the nervous system without unduly disarranging them for the other students. The following subjects among many others should be included: reflex action, coordination, the proprioceptive system, the autonomic system, trophic and vegetative systems. I presume that there would be no difficulty in supplementing this with practical instruction in the laboratory in physiological chemistry and practical physiology, these being designed to serve as a foundation for the special laboratory course to be given to post-graduates.

Anatomy.

During the anatomy course in relation to the nervous system a great deal of what is required, is already covered in the student's course, but a little additional alteration would seem to be necessary to coordinate it in such a way that its bearing on neurology and psychiatry might be emphasized.

Pathology.

Pathology of the nervous system, both naked eye and microscopic, would as now form part of the course.

Psychiatry.

The student should then be ready for the systematic lectures in psychiatry which at present are delivered in the final year. The number of these should be at least sixty; they should be divided into sections, more or less as follows according to the judgement of the professor. There should be included in these sixty, fifty or twenty lectures on the neurosis and psychoneurosis, thirty lectures on mental diseases and ten or more lectures on mental defect, having special reference to abnormal children of the juvenile delinquent type and those suffering from moral instability and constitutional immorality.

Medical Jurisprudence.

The medical jurisprudence might be added to by a few lectures on mental defect and crime and on

crime and its relation to insanity, having special reference to the legal and forensic aspect of insanity.

This concludes the suggestions as regards lectures which might with advantage be delivered to the students. It is realized, of course, that the greater part of these lectures are already delivered, but it is thought that more emphasis might be laid upon them in relation to the special subject.

The Clinical Teaching of the Student.

The clinical teaching of students would be classified under three headings: the early and incipient cases of mental disturbance, secondly the advanced and certifiable cases including those who have already been certified and thirdly neurological cases.

The Clinical Teaching on Early and Incipient Cases.

Clinical demonstrations on patients with early and incipient insanity consisting of twenty bedside talks and attendance at the out-patient clinic, should for preference be made available at a general hospital to which should be attached a special pavilion containing beds for these patients and also an out-patient clinic. The advantage of establishing this ward and clinic in connexion with a hospital attached to a university centre is obvious, in that in addition to the services of experts in neurology and psychiatry, the patients would have the advantage of the advice of specialists in other branches of medicine and surgery. The staff of this special department should consist of experts such as a psychiatrist and a neurologist. Rarely can these two be combined in one person. In addition to these two physicians I think that the attachment of a trained psychologist who need not necessarily be a medical man, would be of great use especially in the application of mental tests and in attempting to ascertain the causes of social and industrial inefficiency in certain cases and to suggest remedies. Laboratory facilities should be available not only for pathological reasons, but also for experimental psychology. The nurses should either have certificates in both general and psychiatric nursing or be in equal numbers. The sister of the ward undoubtedly should have had mental hospital experience and as well should have acquired both her general and mental certificate.

The advantage of this institution for the student would be in the bedside clinic teaching in regard to the neurosis and psychoneurosis and of early and incipient cases. In view of the importance to the community of the propagation of at least the beginnings of this special training amongst the medical practitioners, I am of opinion that this attendance is very necessary and that bedside clinics of this nature should be attended as well as the out-patient clinic.

The Clinical Teaching of the More Advanced Mental Cases.

The clinical teaching in connexion with more advanced mental disease must be carried out at a mental hospital and should include twenty clinical demonstrations. The value of three to six months' residence or attendance at a mental hospital as a

clinical clerk may also be stressed. It may perhaps be possible in the future to make arrangements for a certain number of students, especially during their vacation time, to attend the mental hospitals and accompany the doctors on their rounds. This would be found to be a valuable supplement to the knowledge and experience already gained in the study of mental disease.

Neurological Training.

The student should take the opportunity of attending all the clinical demonstrations on patients with neurological conditions offered to him. In connexion with the teaching of neurology one looks back with regret at the absence in the Commonwealth of the admirable system of neurological clinics delivered free of charge on Saturday mornings so long as thirty-three years ago by that able and brilliant neurologist, Byron Bramwell, who in his own time and through interest in his subjects and his students gave these demonstrations.

Pathological Changes in the Fundus Oculi.

The student should make it his business to become acquainted with the use of the ophthalmoscope, both the indirect and the direct method, especially the former, and should take the opportunity of becoming familiar with all fundal diseases. Here again one may refer with appreciation to the limited classes of six which were held by the specialists in Edinburgh for the students in which examples of all kinds of fundal diseases were shown.

Ear Examination.

Knowledge of the examination of the ear, especially of the hearing and equilibrium tests, such as those of Bárány, should be acquired. Most of these things, as I have said before, are already taught and it would seem that it would only require a little organization to bind all these suggested lectures and practical work into a homogeneous whole, with special reference to psychiatry. It could thus serve as a preliminary course for those who are proceeding to the diploma.

In regard to the suggested teaching for students the following subjects are already taught and would require consolidation and coordination:

(i.) Physiology of nervous system, (ii.) physiological chemistry and practical physiology, (iii.) anatomy of nervous system, (iv.) pathology of nervous system, (v.) psychiatry, (vi.) clinical psychiatry at mental hospital, (vii.) medical jurisprudence.

The subjects not taught to medical students are:

(i.) Psychology, (ii.) laboratory work in psychology.

The following clinical teaching is not coordinated but some is given:

(i.) The neuroses, (ii.) neurological clinical teaching, (iii.) early and incipient mental affections.

Sixty lectures in psychology should be given and thirty hours should be devoted to work in the laboratory.

Post-Graduate Training.

The second part of the university teaching should, I think, be considered with the teaching and train-

ing of graduates who are wishing to proceed to the taking of a degree in psychological medicine or psychiatry. This should consist of a course of two years' duration. Not only should it be permissible to take it in two parts, but seeing that these students are already graduates, I can see no possible objection to the suggestion that they may pass in one subject or one section at a time.

Psychology.

The course of the university teaching for the diploma should consist during the first year of psychology. It is suggested that this should consist of forty lectures. It would be remembered that the student during his undergraduate career has, it is to be hoped, already anticipated some of this work, so that the course should include some advanced psychology such as experimental psychology, social psychology, abnormal psychology, the psychology of conduct and some lectures on the principles of Jung, Adler, Dubois, Dejerine, Janet, Freud and their application, as well as objective psychopathology. Laboratory instruction should be given also in more advanced experimental psychology together with some encouragement to do research work.

Physiology.

The training in physiology should consist of work of a more advanced nature and should include at least forty hours to be devoted partly to lectures and partly to practical and experimental physiology and to physiological chemistry, in so far as it may have reference to mental work.

Anatomy.

Here again it is to be inferred that much of the elementary anatomy of the nervous system will already have been given during the student's career and will have been coordinated in its relation to mental and neurological affections. This course would not only amplify the former, but would involve the study in detail of cross sections and models; time could also be devoted to the cultivation of the experimental approach to the functions and the course of the tracts by ablation and so forth on monkeys and other animals. I think that at least thirty hours could be devoted to this subject.

Pathology.

During the first year a course of lectures and demonstrations at least twenty in number should be attended on the pathology of mental diseases, including specific disease, its symptoms and treatment. This should include two or three lectures on diseased states of the spinal cord, nerves and ganglia, as shown by microscopical preparations of tissues suitably stained and illuminated by lamp or epidiascope. It should also include two hours' demonstration on museum specimens of the gross pathology of nervous lesions with their relationship to symptoms.

Clinical Work.

During the first year it is desirable that the graduate should either be attached to as a resident or should attend as a clinical assistant the wards

of a mental hospital, thus acquiring first hand clinical knowledge of certifiable mental and nervous diseases.

Post-Graduate Course.

During the second year a course of lectures should be given at hospitals for mental defectives, together with some lectures on the neurosis and psychoneurosis.

Neurology.

It is desirable that sixty lectures on neurology and neurological diagnosis should be delivered in the second year, together, if possible, with twenty clinical bedside lectures on neurological diseases. The training in neurology should include the different uses of electricity.

Pathology.

During the second year further work should be done in a pathological laboratory and this should include at least three lectures of one hour at least on epidiascope illustrations of the pathological features of mental diseases. It should also include three or four, if possible more, demonstrations of two hours each with practical instruction in the cutting and staining of sections of nervous tissue. It should also include a two hours' lecture on practical blood chemistry and analysis. Other laboratory work should deal with the methods of procuring and examining cerebro-spinal fluid, of making cultures from faeces, of making swabs, of making test meals and their examination.

Clinical Work.

During the second year attendance for six months should be put in at the psychopathic wards at the general hospital and also at the out-patient clinic; the candidate should attend bedside clinics on neuroses and psychoneuroses.

The other six months' clinical work might well be spent between clinical teaching at the mental hospitals, the psychopathic pavilion and seeing patients with neurological diseases.

Such briefly is the description of what might be considered the course of university training in psychiatry, which would undoubtedly advance the status of this speciality beyond that which obtains at the present moment. While it apparently may suggest an overloading of the student, it really does not do so to a very great extent, especially in the case of those students who have a desire towards proceeding to the acquisition of a special diploma. I hope that the suggestions I have put forward will not appear of too drastic a nature, but I think that it will be admitted that very little of the teaching could be eliminated if efficiency is to be the watchword.

Summary.

1. It is recognized that all the suggestions made in this paper, more especially those relating to the student's training, although desirable are, at present, not completely practicable.
2. It is urged, however, that on entering for the medical curriculum the importance of taking two

years' lectures in psychology should be pointed out to the student.

3. It is stressed that the time has come when the medical profession should make psychology and psychiatry more particularly their own domain.

4. An endeavour is being made in New South Wales to make the present post-graduate course for the diploma of psychiatry a two years' course instead of as at present a one year's course and it is to be hoped that this will eventuate.

5. In conclusion I would like to draw the attention of those who may not be aware of it to the organization of the clinic of Dr. C. Winkler, at Utrecht, designated a clinic for psychiatry and neurology, a description of which will be found in *The Journal of Mental Science*, April, 1924.

TEACHING OF PSYCHIATRY TO MEDICAL STUDENTS

By D. W. CARMALT JONES, M.D., F.R.C.P.,
Dunedin.

I DESIRE to present the point of view of the teacher of systematic and clinical medicine, which often differs from and is sometimes very positively opposed to that of the professed psychiatrist. I make no secret of my own frank hostility to the proposals of the latter and in this discussion it is as well that such views as mine should be allowed for and understood.

Let me make my position clear. I realize that twenty-five years ago my contemporaries and I were turned out very ill equipped with knowledge of insanity and still worse with knowledge of neurosis. Psychology has received very intensive study all over the world in the intervening period and is now a much better understood, better codified and more teachable subject than it was then, although experts still differ profoundly as to its fundamentals. Such special training as I ever had in clinical medicine was in neurology, with its large hysterical or psychical content, and, as I believe, the most important piece of clinical medicine I ever undertook was the charge of a shell-shock centre in the war, I am, therefore, I hope, neither ignorant nor inconsiderate of the mental aspects of disease. However, I shall oppose and obstruct by every means in my power the introduction of the systematic teaching of psychiatry to students, mark you, to unqualified students.

If by a stroke of the pen we could provide such training as would send our students out equipped with sound psychological knowledge and judgement or their basis, such action would have my unstinted support. But no scheme hitherto propounded has contained the germ of any such result; on the contrary none has contained anything but the dissemination of that little knowledge, which in psychiatry of all subjects is such a dangerous thing.

I shall try to indicate my objections as briefly as possible under three headings:

First, the bearing of these proposals on the teaching of clinical medicine; second, the probable value

of any practicable scheme of teaching psychiatry; third, the results of a smattering of psychology.

I have had this matter under close consideration for some years and I have asked for the views of such clinical neurologists and psychologists as are sufficiently well known to me and I have had replies from a distinguished English psychologist now holding an appointment at an American University, from a neurologist on the staff of the principal neurological hospital in London who is also examiner in psychological medicine at the University of London and in close touch with the German Neurological Association which has the same problems, and from an alienist in charge of mental out-patients at a London teaching hospital, who is an examiner for the Diploma of Psychological Medicine of the Royal Colleges. Their views or some of them are embodied in my remarks.

The Teaching of Clinical Medicine.

My psychological colleagues, I think, forget the difficulties which attach to the teaching and learning of medicine; no mature person appears to recognize them unless he has been engaged in teaching and has seen how slowly the recognition of symptoms and their correlation with physical signs takes place. The clinical teacher is well accustomed to the disappointment which meets him when students apparently intelligent are faced with the most obvious cases, and it is with great misgivings that he passes the border-line candidate as qualified to practise medicine. Now as an elementary teacher I simply cannot afford to have psychological red herrings drawn across the narrow path of clinical study. The average student, and it is he for whom we must cater, finds it quite hard enough to recognize a tachycardia from rheumatic heart disease and is greatly perplexed by tachycardia from other causes such as dysthyroidism, phthisis or anaemia. My psychological colleague may not be aware of this, but clinical teachers are. If the student is to have psychical causes of tachycardia brought before him, he will probably not understand the symptom at all. The psychological aspect of disease can be profitably studied only after a thorough grounding in uncomplicated organic disease. I have heard a colleague refer to the wealth of psychological material in the hospital wards, with the comment: "They come in for gall-stones." What is going to be the state of mind of the average student after the dyspepsia, the shoulder-pain, the jaundice, the colic have been laboriously demonstrated, when he is told: "This is all very well, but what this patient really suffers from is a repressed infantile memory." Actually, of course, this is right into the hands of the slovenly student who wishes to retire behind a psychological excuse for evading hard work. Here is a quotation from an examination answer on chronic dyspepsia. "Neurasthenia can give alimentary upset of any possible kind. It is usually a diagnosis arrived at by a process of exclusion. If you ask the man to shake your hand, he has no grip."

My psychologist correspondent from America, writing of that limited group of students who really

have a special bent towards psychology, recognizes the danger of such students neglecting to acquire a sound knowledge of the organic disorders. During the war there was a good deal of work done by men who were psychologists first, in point of time, and physicians afterwards and in my experience their work rarely met with the approval of trained neurologists or the regimental medical officers who were concerned with the results produced on their men. In my opinion if a psychologist came to me to be trained in medicine, my first advice to him would be to forget everything he had so far learnt about disease.

As a teacher of clinical medicine I have to contend that it is premature and destructive of sound professional training to introduce students to psychological study before they are well grounded in organic disease, which is a lengthy process.

The Probable Value of the Schemes for Teaching Psychology.

We have heard to-day something about the American scheme for the diploma of psychological medicine and Dr. Hogg's comment to the effect that ten years' experience of the practice of psychiatry are required to substantiate a claim to special knowledge. That is enough to indicate the extreme difficulty of the subject. But on the plea of preventing the medical student from acquiring (I quote from my psychologist correspondent):

That blindness towards the mental aspect of his patients which is all too common among medical men, we are asked to give him a series of occasional lectures throughout his course. Quite apart from any interference with general clinical training, if I desired to see students trained in psychology by the time they qualify, I should regard any such course as absolutely futile. It would be like the French one learnt at school, a subject of quite secondary importance to which no one paid any attention, and which left one after five years completely ignorant of French literature and incapable of conversation in that language. Arnold, of Rugby, nearly a century ago, put the matter quite clearly. He said: "I know too well that most of the boys would pass a very poor examination even in French grammar. But so it is with their mathematics and so it will be with any branch of knowledge which is taught but seldom, and is felt to be quite subordinate to the boy's main study."

My London alienist tells me that he finds psychology:

Undoubtedly a difficult subject, difficult in itself and difficult inasmuch as, unlike anatomy, opinions vary very widely amongst its professors. It is, therefore, a subject exceptionally difficult to teach and exceptionally difficult for the medical student to learn. He has throughout his course been brought into intimate contact with an objective world. In psychology he passes into a world of abstractions with which he finds it difficult to deal. My experience as an examiner both in psychology and psychiatry convinced me that of the mass that is taught, it is a very small percentage that adheres and is absorbed. The diploma of psychological medicine candidates average about thirty years of age, but of these at each examination there are only two or three who give evidence of anything like an understanding of psychology.

My neurological friend says:

I have been examining in psychological medicine at London University for the last few years and my experience

is that it is quite useless to expect even qualified men to learn sufficient of psychology to be of use for clinical purposes, unless they can devote upwards of a year to its study.

If this is so and my correspondents express very aptly my own profound belief, what good will come of the only possible training which can be given to immature boys and girls of twenty? These experts of mine are all agreed that psychology is essentially a mature mind's study and that it requires long and close application, quite as long as for the study of physiology to which two years is allotted. The Oxford "Greats" course, which is a study of ancient history and philosophy and involved even thirty years ago a good deal of direct psychology, is a two years' course given to highly selected students. Most people are agreed that the course is none too long for its purpose.

Now, we have no room for anything of this kind in our curriculum. The psychologists desire to take time from physiology, from pathology, from bacteriology; in fact to turn these into smatterings to make room for a smattering of their own specialty. But all these subjects will be done once and for all. Most students will never look at another section or plant out another culture after they have left hospital, but structure and function, their disturbance by disease and the nature of the living organisms that cause the changes, must be in the very bones and marrow of them, must have been incorporated in their mental make-up if they are to understand medicine as we understand it today. That is why this long time and the apparently futile study of the ingredients of culture media are required; they belong to the subject. There is no short cut to it; it is not the cramming of a text book, as an eminent psychologist has written: "Intellectual knowledge is a very different matter indeed from assimilation in consciousness" and the latter is what we require.

I, therefore, take the view that any scheme of instruction in psychology superposed on our present curriculum is demonstrably futile because the time available is quite inadequate to the magnitude and difficulty of the subject.

The Results of a Smattering of Psychology.

The obvious retort to this contention is in the sense that half a loaf is better than no bread. I shall be asked whether ophthalmology ought not to be cut out of the course, since I can hardly contend that a few weeks in the eye department turn out a student as an expert. Surely, people will say, I must admit that most medical men never work out a refraction or examine a disc throughout their careers and it is only the odd man here and there who discovers a facility with the ophthalmoscope and some appreciation of what it reveals. Why not give the potential psychiatrist the same opportunities?

That is, of course, the crux of the whole matter and contains the real reason why the people whose views I share, are so vehement against half-instruction in this subject. It is because psychiatry is an

exceedingly dangerous thing to play with and in expert psychiatry has perhaps as great a potentiality for evil as inexperienced surgery. I fancy that any psychiatrist would hesitate to submit a patient to the operative attentions of one who had had the amount of training in surgery which he advocates for psychiatry. Yet psychiatry is expected to come into this person's practice, he is constantly to use it, not to refer his patients to a specialist, as he would for ophthalmic or surgical disorders. And with a smattering of psychology it is possible to do very serious harm.

In a slightly different sphere I have recently had to treat two students from a training college, one suffering from an adolescent mental breakdown associated with family and financial worry, and the other with mental symptoms following an injury to the head. Both were young boys of about twenty, taking psychology as part of their course. I have rarely had more difficult patients to treat on account of their introspection and self-analysis. What they will pass on to their pupils I do not know, but I doubt its value and after seeing them I dislike the prospect of medical men nearly as immature and as imperfectly instructed, undertaking the mental charge of their patients.

At the end of the war, when there was a great boom in psychiatric treatment, it was commonly stated that the London nursing homes were full of mental wrecks driven there as a result of these methods. That is a quite unsupported statement as I make it; anyone could say such things of any treatment and I can only say that my informants were psychiatrists of standing from two of whom I have quoted today. It is not difficult to understand. Imagine any decent person suffering from neurasthenia who falls in with an enthusiast, half trained in Freudian doctrine, who attempts an analysis, and assures the patient that his symptoms are due to some suppressed incestuous desire. Think of the mental distress which inevitably follows and remember that it is just your half instructed enthusiast who commits these follies.

One point upon which my experts insist, is that if systematic instruction is to be given in psychology, it must be by a real specialist in the subject, otherwise instruction will be limited to the cult of the moment, as has so much been the case with that of Freud.

Now, I do not want to commit the impertinence of criticizing Freud, with whose works I have only the most superficial acquaintance. I believe that psychology is one thing before Freud and another thing after him, that he is to mind-study what Mackenzie is to heart-study, if you like. I am aware that when Freud speaks of homosexuality, he does not mean an unnatural offence, but the particular quality of the relations of a person with one of his own sex, such as those between a boy and his father, as contrasted with his relations with one of the opposite sex, such as those between a boy and his mother, and we are all aware of the contrast. But Freud has emphasized the importance of sex in

psychic affairs, and its necessary social suppression and there is no doubt whatever that this has proved an immense attraction to the prurient minded among our profession and among our patients and there is a satyr living within all of us. It may all be perfectly true and the real psychologists are agreed upon the greatness of Freud's discoveries, but I am old-fashioned enough to believe that all things are not expedient to teach.

I can think of no greater disservice to the young practitioner than the direction to approach his patients on the sexual side; I do not think it is desirable to teach young people that the symptoms they have to treat have their origin in unspeakable abominations. That these are not essential to Freud's psychology, I am aware; I have myself undergone psycho-analysis at the hands of a Freudian, when not one word of sex-talk in the common sense was mentioned throughout. On the other hand, I have been associated with a psychological clinic where so much prurient information was extracted from patients and was so evidently sought for, that I could only regard the atmosphere as an unwholesome one both for doctor and patient.

My objections to a smattering of psychology and a nodding acquaintance with psychiatry being conferred upon students are that they are too immature to handle such explosive material with discretion, that there is a grave risk of serious damage being done by attempts at treatment carried out in all good faith, that abuse of the methods employed may readily occur, except in particularly reliable hands and that this is open to very grave ethical censure.

You will ask me if I propose to act the ostrich and shut my eyes to the progress which is going on around me. I hope not. It would be useless impertinence for me to talk platitudes about the importance of psychology in industry, education, justice and so forth, on all of which points this company is better informed than I am. I am quite ready to accept the verdict of trained psychologists in the matter. My point is that a doctor needs to be a doctor first and a psychologist afterwards; that a student will get his medicine all wrong if he goes to it prejudiced by psychology and that at the ordinary age and with the ordinary experience of the world of a student he is much too immature for this study, which he can make with great advantage later on, if the subject interests him.

I think psychology is a post-graduate study and that the person suited for it is well described by my alienist correspondent. There are three requisites: (i) Good general education of a broad sort, (ii) mature age and knowledge of the world, (iii) a good medical education.

For undergraduates, I think, there is nothing very definite or specific to be done during their course. My most helpful advice from London is that what the student requires is a practical acquaintance with the subject which he can obtain from teaching in psychiatric wards (where they exist) and in the out-patient department and wards of a general hospital. That is all they do in London and is all that is required of students who are

taking the ordinary qualifying degrees on the Continent. In this way, I take it, there is some instruction in psychology as it is applied in the art rather than the science of medicine.

As for the serious study of the science of psychology my own conviction is that the doctor who wishes to take it up, can do so with advantage only as a post-graduate study.

These remarks of mine are obviously no more than destructive criticism; I regret that I have nothing more constructive to suggest, but I speak from the point of view of the exponent of clinical medicine, the interests of which I have to defend. I can only say that the proposals so far put forward by the psychiatrists are not acceptable to the general physician. The psychiatrists must devise something less likely to be injurious to our essential branch of medicine before we can accept their dictation.

DR. ST. L. H. GRIBBEN (Seacliff) agreed with Dr. Carmalt Jones that the teaching of psychology should be a post-graduate study. They should walk before they attempted to run. These things were being rather forced upon the profession. As a teacher of mental diseases to medical students he realized that the curriculum was crowded and that the lectures on mental disease should not be thrust too much into the foreground. A specialist should first of all have been a general practitioner.

DR. J. MACPHERSON (Auckland) agreed with Dr. Carmalt Jones in the matter of learning psychology. He would say that three years was a reasonable period to devote to this study. He had not much faith in psycho-analysis, though he practised it himself to a limited extent and had had some successes. A smattering of psychology was worse than useless.

DR. H. F. MAUDSLEY (Melbourne) referred to differences between the lay psychologists. The lay psychologist should be forced to call in medical opinion in his work. He agreed with Dr. Carmalt Jones that the present course should not be curtailed. But the idea was not to train psycho-analysts, but to teach the medical student to recognize the early stages of mental disease. The student should be taught how to approach patients and he should also be taught that psycho-analysis was very dangerous in unskilled hands.

DR. A. R. FALCONER (Dunedin) thought that more training was necessary in psychology and mental hygiene. There had been confusion of thought in that psychology was not psycho-analysis. The lay psychologist had to a certain extent displaced the medical psychologist and that was exactly what should not be allowed. The layman should be the servant of the medical man.

DR. S. J. MINOGUE (Callan Park) said that general practitioners had a profound ignorance of things psychiatric. Especially in women mental symptoms were frequently referred to their sexual organs and 50% to 60% of those admitted to mental hospitals had had abdominal section. General practitioners could not recognize early mental states. Therefore to do justice to the public the student should learn more mental hygiene, so that he could recognize the early signs of mental disease.

DR. H. M. NORTH (Gladesville) thought that Dr. Hogg's paper introduced too sweeping reforms. A course of fifty to sixty lectures was important in the training of a student and this should include some descriptive psychology. It should be placed at the end of the medical course. Regarding the care of mental defectives he thought that Dr. Moore was too sanguine about what could be done by environment.

DR. R. H. BAXTER (Christchurch) frequently encountered mental symptoms in his neurological patients. He was often asked to give a prognosis. He had been taught very little psychiatry in his course, but it had proved very useful. The main problem for the general practitioner

was to determine when the mental condition was bad enough to warrant him in sending the patient to a mental hospital. He felt it was necessary that some tuition in psychiatry should be included in the curriculum. No matter how much psychiatry was taught, he hoped that very little importance would be attached to psycho-analysis.

DR. E. A. BUCKLEY-TURKINGTON (Auckland) thought that in the teaching and training of mental defectives the medical psychiatrist not the layman should be the final court of appeal. There was a danger of the layman displacing the medical man.

DR. LATHAM, DR. MOORE, AND DR. CARMALT JONES briefly replied.

SECTION XI.—ORTHOPÆDICS.

CHRONIC EPIPHYSITIS AND METAPHYSITIS.

By A. OWEN-JOHNSTON, M.B., B.S. (New Zealand),
Medical Superintendent, Southland Hospital.

IN all the text books that have been at my disposal I have not met a description of chronic epiphysitis and metaphysitis except in relation to a specific disease, tuberculous disease of the joints. In the discussion on the pathology of this latter condition the tuberculous process is stated to commence either as an arthritis with the initial lesions situated in the synovial membrane or as an epiphysitis with later involvement of the joint. Some say that synovial membrane is never the primary condition.

The tubercle bacillus can usually be found in the synovial type, but rarely in the epiphyseal type.

The only description of epiphysitis given in the text books is of the acute suppurative type. This condition is usually grouped with acute osteomyelitis and periostitis. But there is one important point that I would like to mention in connexion with the pathological anatomy of acute osteomyelitis. Tubby, in discussing the pathological anatomy of acute osteomyelitis and allied conditions, states that in growing bone the disease is in his opinion in the majority of cases a juxta-epiphysitis in the first place and the osteomyelitic and periosteal symptoms are of later advent. Other authorities concur with this view. This point has an important bearing on the elucidation of the chronic condition that I am about to describe. Also, this chronic condition is closely allied to tuberculous arthritis so I would ask you to visualize the clinical and pathological picture of that disease.

Commencing some five years ago I had quite a considerable run of patients with acute and chronic inflammatory bone and joint affections spreading over some three years. They commenced in several instances as acute osteomyelitis. In every case we endeavoured to isolate the infecting germ.

Among these patients were some in whom the pathological condition was a chronic inflammation localized to the metaphysis or juxta-epiphyseal site. These could be divided into three groups, as far as the bacteriology was concerned:

Group 1.—Two or more epiphyses in the same patient were affected and the bacterial cause of the initial epiphysitis was determined. In multiple con-

ditions the same germ was isolated in the several epiphyses affected.

Group 2.—A single epiphysis was affected in which one organism was isolated.

Group 3.—A single epiphysis was affected in which for various reasons the organism was not isolated.

As a result of my experience of these cases I have come to the conclusion that chronic epiphysitis is quite a definite and fairly common clinical entity. I have also concluded that it is not always a tuberculous manifestation. It occurs between the ages of three and fifteen years, but most frequently about ten to fourteen years.

The infecting organism in my series of cases was exclusively *Staphylococcus pyogenes aureus*.

We already know that tubercle bacilli can cause a very chronic and slowly progressing epiphysitis. Other organisms would also probably cause the same condition.

Ætiology.

Injury probably plays a small part only in determining the epiphysis affected, but undoubtedly the actual cause is the deposit of germs by the blood stream in the neighbourhood of the epiphysis. The germs are usually deposited in the metaphysis or juxta-epiphyseal part of the diaphysis. The germs may also be carried through into the centre of the epiphysis by a small artery from the diaphysis.

Pathology.

The bones affected have been with one exception those of the lower limb. The epiphyses affected have been with fairly equal incidence upper and lower ends of femur and tibia. The lower end of the radius was involved once. The children in every case have been robust.

When the germs are deposited close to the epiphysis, they may be so attenuated that they are immediately shut off by a very little inflammatory reaction. Inflammation subsides without any necrosis, but the germs may be activated at any future date should the epiphysis suffer any trauma. Should the germs be of a slightly more active strain, they cause a slightly greater reaction which ends in the death of a small portion of the upper end of the diaphysis. But the inflammatory reaction limits the further spread of infection. There then exists a small abscess cavity in the upper end of the diaphysis. If left to itself the abscess finds its way to the surface of the bone just beneath the cartilaginous plate between the diaphysis and the epiphysis. The abscess is then opened or it works its own way to the surface and when all pus and sequestra have been discharged, healing sets in.

Symptoms.

There is a history of soreness in the neighbourhood of a joint of a duration of from one to twelve months. At first the soreness does not tend to persist; it may be present only when some exceptional movements are undertaken, such as running, playing games, skating and the like. Gradually the soreness increases in frequency, but not in severity. Resting will always ease the soreness. When there is no

soreness, there is no swelling, no tenderness, no limp and no interference with function. But if for any reason, for example after violent exercise, soreness is complained of, there may be some swelling. Tenderness will be elicited by percussion over the affected epiphysis. Extreme movements of the neighbouring joint may elicit tenderness and there may be a lump. The temperature may be raised to 37.2°C. (99° F.). Examination of the blood at this stage will reveal in the case of a non-tuberculous lesion an increase in the leucocytes with probably further relative increase in the polymorphonuclear cells.

X ray examination will reveal the presence of a small cavity in the neighbourhood of the epiphysis.

Diagnosis.

Pneumatic conditions can be excluded, as careful examination will show the disease to be at a little distance from the joint. Movements of the joint probably will not be affected and there will be deep tenderness over the epiphysis. Growing pains are more indefinite and are not so well localized.

Chronic arthritis can be excluded as there are no symptoms of joint trouble. Finally X ray examination will reveal the presence of a cavity.

Tuberculous Disease of the Hip.

In lesions of the hip the symptoms may be those of early tuberculous disease. It is impossible to palpate the neck, but X ray examination will reveal whether the disease is located in the metaphysis or the epiphysis. If the metaphysis is affected, the differential diagnosis is unimportant for the best treatment even for tuberculous disease is early operation to prevent infection from spreading to the joint.

If the epiphysis is the first site affected, the absence of a family history of tuberculosis, the absence of any obvious tuberculous focus in the lung and the presence of a leucocytosis with relative increase of the polymorphonuclear leucocytes indicate an epiphysitis of pyogenic origin. In doubtful cases the lesions should be treated as tuberculous.

Prognosis.

In the milder form in which no necrosis occurs, but in which the germs still lie dormant surrounded by scar tissue, a guarded prognosis should be given. In the majority of patients nothing further may develop. But in one patient of mine quite serious results followed trauma and there was quite an interesting compensation case.

In those patients in whom a small cavity develops only in the metaphysis and this is opened and heals, no further deformity nor loss of function will occur. But when the disease develops in the epiphysis and causes necrosis, the prognosis is more serious as the most favourable result to look for is an ankylosis in the best position.

Treatment.

As regards the treatment employed the affections fall into two groups: (i) in which the disease is localized to the metaphysis, and (ii) in which the epiphysis is involved.

In those cases in which the disease is localized to the metaphysis, operative treatment is indicated. The cavity should be opened up in such a way that drainage takes place away from the joint.

The after care of these patients is merely that of wound treatment and the prevention of deformity due to inflammation and contracture of the soft parts. Hip extension in the abducted position should be applied. When knee or ankle is affected, supporting in splints is all that is necessary.

I have found continuous irrigation with Dakin's solution the best form of wound treatment. The cavity fills up with new bone and the wounds heal rapidly. Once the wound is healed and the cavity is seen in the skiagram to be closed, all retentive apparatus can be removed and the child allowed free use of the limbs. Period of treatment is only a matter of weeks.

In the second group the treatment is more difficult and prolonged. The joint is involved sooner or later, abscess develops and ultimately has to be opened. The final result if operation is undertaken only when an abscess has formed, is ankylosis of the joint. It may be necessary to perform sequestrectomy several times. I have treated three patients with this condition by this expectant method and on each one several operations had to be performed. The final result has been a bony ankylosis. In any patient in the future, I shall attempt by early operation to drain the epiphysis from outside the capsule. It may not be a success, but I should think that at least it would lessen the area of necrosis and lessen the period of treatment even if it still ended with an ankylosed joint. Needless to say the joint has to be well supported and fixed by splints, whilst extension is necessary and adds to the comfort of the patient.

Case Reports.

I shall now give a short history of some of the typical cases.

CASE I.—W.B., aged nine years, was the first patient. It was because of him that I first realized the possibility that epiphysitis of pyogenic origin could so closely simulate a tuberculous epiphysitis.

He was admitted on July 24, 1922.

On July 21, 1922, a sudden pain above the left ankle appeared. The leg was treated by rest and application of heat for three days.

The previous history was good. The family history revealed that one of his sisters had had a choreic affection with a rheumatic heart lesion. There was record of tuberculous disease in the family.

The lower portion of the diaphysis of the tibia was very painful, red, swollen and very tender to percussion. The patient's temperature was 39.2° C. (102.6° F.), the pulse rate 128 and the respirations 22 in the minute. On the morning of admission the temperature was 37.8° C. (100° F.), the pulse rate 120 and the respiratory rate 20. On the following morning his general condition was good.

An operation was performed on July 25, 1922. The lower end of the diaphysis was drilled and pus escaped. The opening into the bone was enlarged. Dakin's tubes were inserted. A swab of pus was taken for examination.

On July 26, 1922, the pain in the tibia was relieved. The culture tubes revealed a growth of *Staphylococcus pyogenes aureus*.

On July 28 the patient complained of pain over the lower end of the right radius. It was very tender to percus-

sion over the lower end of the diaphysis. The temperature had risen from 37.2° C. (99° F.) on July 27 to 38.3° C. (101° F.).

A further operation was carried out. The lower end of the diaphysis was drilled. A swab was taken of the escaping discharge. A pure growth of *Staphylococcus pyogenes aureus* was obtained from the swab.

On August 10, 1922, a good deal of pus had discharged from both wounds.

On October 2, 1922, an operation was performed to remove sequestra whose presence had been revealed by X ray examination.

On October 2, 1922, the wounds were healing well. The general condition of the patient was excellent. There had been only an occasional rise in temperature above normal since August 3, 1922. He had some tenderness over the inner condyle of the right femur.

On October 17, 1922, the radiographer reported of the right knee that there was probably a cavity of the epiphysis at the inner side of the condyle.

On October 21 the patient was allowed up. The wounds were healing and the right knee was not so tender.

On October 30 the wounds were healed and there were no complaints. He was discharged from hospital on November 7, 1922.

On November 20, 1922, the patient was readmitted complaining of pain in the left hip joint and right knee. There was a slight amount of flexion at the left hip joint, but no pain on movement of the joint and no tenderness around the joint. The thigh muscles were slightly wasted.

There was an enlargement of the internal condyle of the right femur with slight stiffness of movement of the joint. The limb was put up in double extension.

The radiographer reported that the epiphyses of both the femur and the tibia at the knee joints appeared abnormal, possibly tuberculous disease of the hip.

On November 25, 1922, there had been no pain in the hip since admission.

By November 30, 1922, the flexion of the hip was diminishing. On January 1, 1923, the patient's limb was still up in extension. There was no pain in either the knee or the hip.

The temperature occasionally rose above normal to 37.8° C. (100° F.).

A painless abscess formed on January 7, 1923, on the inner side of the knee. Pus was obtained on opening it and a pure growth of *Staphylococcus pyogenes aureus* was obtained. A search was made for tubercle bacilli, but none was found.

On January 17 a skiagram revealed a sequestrum under the skin over the internal condyle as well as a cavity in the metaphysis of the tibia.

The sequestrum came out of the sinus on January 18. On February 3, 1923, the patient was very well.

On March 20, 1923, it was discovered that a cold abscess had formed behind the knee. This communicated with the upper part of the tibia.

On June 1, 1923, the patient was very well. The femur sinus had healed. He was allowed up with a Thomas's hip splint on the left leg and a knee splint on the right leg.

The radiographer reported on June 8 that there was a cavity in the centre of the tibial metaphysis, possibly containing a sequestrum. The sinus was still present.

The patient was discharged in splints and using crutches on July 3, 1923.

His subsequent history is entirely as an out-patient. He became very irregular in his attendances and would not come into hospital again as an in-patient. He very soon broke his splints and they were removed.

By September 17, 1923, an abscess developed behind his left hip and a sequestrum came out and the sinus closed, all in the course of a fortnight, without medical attention. Abscesses formed and opened spontaneously and discharged sequestra from the metaphyses of the upper end of the right tibia and the lower end of the left femur during 1924. By the end of 1924 all the sinuses had healed.

Altogether this patient had six metaphyses affected. The affection in the first two attacks was subacute and in all the remainder chronic. The same germ was obtained from three of the lesions. In each chronic lesion an abscess formed and a small sequestrum found its way to the surface. A cavity which ultimately filled in, was left in each affected metaphysis after the extension of the corresponding sequestrum. While the abscess formed there was no general disturbance whatever and also very little local reaction. During the formation of the last three abscesses he was continuously up and about with little or no medical attention.

He now suffers no deformity nor loss of function whatever of any of the affected limbs.

I saw him last in December, 1926. The growth of the affected bones has not been interfered with at all.

CASE II.—J.K., a male, aged thirteen years, was admitted on May 26, 1922, with a subacute metaphysitis of the upper end of the left tibia.

His previous history was good, as was the family history.

Ten days before admission he was kicked on the left knee at football. Seven days later the knee became swollen, painful and tender. On admission it was found that there was a tense, tender and red swelling over the upper end of the tibia. The patient's temperature was 39.4° C. (103° F.). His general condition was good.

The swelling was incised, but no pus was located.

On May 29, 1922, the wound was explored and pus was located under the periosteum over the upper part of the diaphysis.

The patient's temperature subsided to normal during the period to June 4, 1922. On July 1 a small spicule of bone came out of the wound. On July 20 the wound was healed and on August 2, 1922, the patient was discharged relieved.

He was readmitted on November 16, 1922. For two months he had had pain in the left hip and a limp.

There was a slight general enlargement of the hip region, with 30° of flexion and 3.75 centimetres (one and a half inches) of apparent but not actual shortening. There was no tenderness nor pain in manipulation of the hip joint.

The right hip was normal. The heart, chest and urine were also normal. The patient was a healthy looking boy.

X ray examination revealed flattening of the head of the bone. Tuberculous disease was diagnosed.

The leg was put up in extension in the abducted position.

The patient remained well and free of complaints up to March 20, 1923. A Thomas's hip splint was applied.

On April 24, 1923, the radiographer reported that the flattening of the head of the bone was still pronounced; it was probably pseudo-coxalgic, not tuberculous.

On May 1, 1923, he was discharged wearing a Thomas's hip splint and a batten on the other boot.

Within three months the splint was discarded and the patient was allowed full use of the hip. No deformity and no loss of function were noted. The only evidence of hip trouble was the flattening of head of the bone revealed by the skiagram.

He was readmitted on August 8, 1924, complaining of pain in the left thigh and groin.

Two months before, whilst working as a carpenter's apprentice, he was stepping through a window, right foot first, and carrying a piece of four by four timber. His right foot slipped and he came down heavily on the window sill on the middle of his left thigh in the fully abducted position. At the same time he dropped the heavy piece of timber on to the middle of the same thigh. He suffered an extensive hæmatoma of the middle of the thigh.

On admission there was the thickened remains of a hæmatoma that had extended almost completely round the middle of the thigh. He complained also of pain in the left groin.

A chronic abscess developed slowly at site of the hæmatoma. It was opened on September 17, 1924. A sinus extending from the upper part of the hæmatoma towards the hip was found.

On October 20, 1924, the sinus was discharging freely. The patient had a good deal of pain in the hip region. On November 11, 1924, a splint and extension were applied. On December 2, 1924, two small sequestra were detected in the sinus below the hip in the skiagram. By May 22, 1925, the sinus had been healed for some time. A skiagram taken on July 5 yielded evidence of definite flattening of the head with diffuse outline thickening of acetabulum. There was no necrosis. The question was raised whether ankylosis of the hip was taking place.

On July 20, 1925, the patient was discharged with instructions to report at intervals.

A skiagram taken on January 23, 1926, reveals flattening of the head of the femur with lipping of the acetabulum.

This boy had an obvious subacute metaphysitis of pyogenic origin which was followed almost immediately by a deposit of some very attenuated organisms in the middle of the upper epiphysis of the femur. Under treatment this subsided, leaving only a slight flattening of the head. A severe traumatic strain on the hip reactivated and aggravated the disease, causing some necrosis and finally ankylosis of the hip.

To me it seems fair to assume that the hip condition was caused by the same germ as caused the subacute condition of the tibia.

CASE III.—S.C., a male, aged fourteen years, was admitted on September 8, 1925.

Four weeks before, when returning home from school, he noticed that his left foot hurt him when he ran, but not if he walked. The next week he did not notice it very much. Shortly after he was skating and he had to stop because of the pain. It had remained sore and was worse with use and easier with resting. The foot swelled with use, but the swelling subsided on resting.

No information of importance was discovered in the previous or family history.

There was a small patch over the front surface in the region of the metaphysis of the lower end of the tibia, where there was slight swelling, redness and tenderness. Ordinary movements of the ankle were painless. Extreme dorsiflexion was painful. Heavy percussion on the sole of the foot and on the tibia away from this small tender area was painless. The temperature was 36.4° C. (97.2° F.) and the pulse rate 96. There were 16,400 leucocytes per cubic millimetre of blood.

A skiagram revealed an area of rarefaction of the lower end of the tibia corresponding to the painful area. The patient was kept at rest and then was allowed up and about to observe the effect upon the bone. The temperature rose to 37.2° C. (99° F.) occasionally; otherwise the bone was easy with rest.

On October 7, 1925, an operation was performed. A cavity in the tibia was opened. It contained pus from which a culture was made. *Staphylococcus pyogenes aureus* was obtained.

On November 16, 1925, the wound was well healed. The patient walked without disability. He was discharged.

This case is typical of those in which only one metaphysis is affected, in which the condition is chronic from the start and in which the infection is definitely staphylococcal.

CASE IV.—J.S., a male, aged three years, was admitted on November 3, 1922, complaining of pain in the right hip.

About a year before the patient was in hospital suffering from an attack of pain in the right hip accompanied by fever. A skiagram was taken at the time, but no difference between the two hips was observed. He recovered for a time, but later a limp had appeared. A week before admission a skiagram was taken and a small cavity was revealed in the neck of the femur.

The family history was good.

The child limped, kept his right knee bent and walked on the tip of right toes. His right leg and thigh were wasted. Abduction of the hip was limited, but flexion was not limited. The thigh could be fully extended. The heart was normal and nothing pathological was detected in the chest or urine.

The limb was put up in extension and abduction.

An abscess slowly formed. The top of the cavity in the neck of the femur gradually opened. The abscess spread towards the surface. The temperature rose occasionally to 37.2° or 37.8°C. The abscess was opened on September 7, 1923. A small sequestrum came out and the sinus healed by February 10, 1924.

Cultures from pus from abscess contained only *Staphylococcus pyogenes aureus*.

He was discharged from hospital on September 16, 1924, with no disability, no deformity of hip and full range of movements.

This was a case in which we were sure that we were dealing with a tuberculous lesion, but only staphylococci were found in the pus.

I feel that had we operated on this boy as soon as he had come under our care, we would have saved him twelve to fifteen months' treatment in hospital.

The cavity in the bone ultimately disappeared and the growth of the femur was not interfered with at all. The absence of any permanent disability and the steady progress made, once the abscess was opened, were in marked contrast to what takes place in a typical tuberculous bone lesion.

CASE V.—H.C., a male, aged four years, had a condition similar in history, progress and final recovery to that of Case IV, but we failed to obtain a bacteriological report of the pus before contamination. But the acute onset, high leucocytosis and rapid progress once a small sequestrum was extruded, the complete absence of permanent disability, the filling in of the cavity of the neck of the femur and the robustness of the patient strongly support a diagnosis of a non-tuberculous lesion.

CASE VI.—A.M., a male, aged ten years, had a condition diagnosed as tuberculosis of the hip with an acute onset in which the germs were deposited in the metaphysis. But so rapid was the spread of the inflammation towards the epiphysis that within a very short period the whole head was detached from the neck and lay as a sequestrum within the acetabulum. In this case the very acute onset, the appearance of ill-health in the acute stage, the rapid healing that took place on removal of the necrosed head of the femur and the rapid improvement in general health were features rather of a pyogenic infection than of a tuberculous one. He was a very robust boy of excellent previous and family history. I would diagnose this case as a subacute metaphysitis of the femur.

Summary.

In all I have treated fourteen patients suffering from a condition that I would now diagnose as chronic epiphysitis or metaphysitis. Heretofore I would have labelled all these cases with the exception of three, tuberculous. The three I would have called Brodie's abscess. I do not call them tuberculous because in the majority other germs were isolated from the pus, because there was no evidence of tuberculosis elsewhere in either the patients or their families and because the general reaction of the patient was rather to a pyogenic than to a tuberculous infection. I have treated concurrently with these some forty odd patients with acute osteomyelitis and bone and joint tuberculosis. In every case of joint tuberculosis there was evidence

of either active or quiescent tuberculosis of the lung, in many instances with a family history of this disease. Apart from the initial chronicity these cases of epiphysitis in their general reaction and appearance, simulated rather the chronic stage of acute osteomyelitis than the frankly tuberculous infection.

The three cases were typical of what is described as Brodie's abscess.

I have been unable to get a good full description of Brodie's abscess, but as far as I can gather it is a circumscribed abscess contained within a cavity anywhere along the shaft of the bone. It may or may not have followed upon a previous osteomyelitis in the same part of the bone. It is usually quiescent for a long period of time. It is stated to occur most frequently in the tibia and humerus. In my patients the chronic epiphysitis occurred with almost equal frequency in the tibia and femur. Including these in all my patients except one, the disease process progressed steadily although slowly from its onset until arrested. There were no long, absolutely quiescent intervals and apart from the three there were never any definitely circumscribed abscesses within the bone. Apart from the three I would not diagnose the conditions as Brodie's abscess. I finally decided to call them chronic epiphysitis and metaphysitis of non-tuberculous origin.

As a result of my experience I would say that in all bone infections of children the germs are deposited from the blood stream either in the metaphysis or in the central part of the epiphysis. The germs may be the tubercle bacillus or any one of the pyogenic group. The series of changes that take place in the bone then depends entirely upon two factors.

In the first place there is the balance that exists between the virulence of the deposited germs. In the second place there is the location of the germs, whether in the metaphysis or the epiphysis.

The various series of changes that ensue in an infected bone consequent upon these two variable factors can be divided roughly into two groups.

If the germs are virulent, of the pyogenic group and are deposited in the metaphysis, an acute osteomyelitis rapidly ensues unless very early operation is undertaken.

If the germs are virulent, are of the pyogenic group and are deposited within the epiphysis, an immediate necrosis of the whole epiphysis occurs with infection of the joint.

If the germs are pyogenic, avirulent and are deposited in the metaphysis, a chronic suppuration, together with a small area of necrosis, takes place. The pus spreads to the surface of the bone, as previously described.

If the germs are as in the previous group but are deposited in the epiphysis, a small area of necrosis occurs with suppuration. The pus will then most likely spread into the joint.

If the germs are avirulent and the local and general resistance high, neither necrosis nor suppuration will occur.

If tubercle bacilli are deposited in the metaphysis, the series of changes is more likely to be one of gradual erosion with absorption or suppuration rather than necrosis with suppuration.

If the tubercle bacilli are deposited in the epiphysis, the series of changes will be the same as in the preceding group.

This grouping of the pathology explains the series of changes that have taken place in the various patients whom I have treated.

It is important to have a clear understanding of the pathology and causation if we are to arrive at the most satisfactory treatment of these conditions.

The object of all our treatment should be to limit the spread of infection, to prevent the occurrence of deformity and to have the minimum of permanent disability.

This ideal of treatment will be most closely approached by keeping the joint complications down to the minimum, that is by early and correct treatment.

DR. J. RENFREW WHITE (Dunedin) said that instead of disability due to ankylosis of the neighbouring joint, his experience had taught him that the patients were suffering from a disability due to unequal growth of the epiphyses. He referred to the condition of patients who had had as much as forty-three millimetres (an inch and a half) lengthening of one leg and of several patients with shortening. He also spoke of deformity due to destruction or partial destruction of one of the bones of the leg or forearm. He asked for any suggestions for treatment of these conditions and pointed out the difficulties in the way of operative correction.

DR. LESLIE WILL (Christchurch) said that he had seen only three patients with conditions of the kind described. Instead of ankylosis of the joints the end result had been deformity due to unequal growth at the epiphysis.

DR. N. D. ROYLE (Sydney) stated that he had not seen this condition as frequently as Dr. Owen-Johnston had. He had, however, studied one patient with the aid of skiagrams taken at frequent intervals and had noted the changes similar to those which Dr. Owen-Johnston described.

DR. OWEN-JOHNSTON replied by saying that he thought from the extraordinary cases which had occurred in his practice in so short a time, he had struck a patch of these cases. He further showed skiagrams of the condition.

SACRALIZATION OF THE FIFTH LUMBAR TRANSVERSE PROCESS AND ITS RELATION TO LOW BACK PAIN.

By K. S. MACKY, M.B., B.S. (Glasgow).
Auckland.

THOSE of us who in the course of our work examine many "back cases," realize the difficulty in arriving at a sure diagnosis—a diagnosis which will not be an injustice to our patient. In no location which comes within the scope of orthopaedic surgery, is it more difficult to make the diagnosis, because here we have to remember the muscles, the several joints and nerve roots and plexus which are in close relationship to one another. It may be laziness or ignorance, but too often one sees a diagnosis of lumbago and sciatica made after a most incomplete examination. The diagnosis of a "back case" should be made only after the usual routine of (i) inspection,

(ii) palpation, (iii) movements which in orthopaedics replace percussion, (iv) special tests, (v) a neurological survey, (vi) an X ray picture examination.

Very often the fate of the patient, whether the condition is cured at an early stage or becomes chronic depends on the diagnosis, and a patient with a chronic back affection is to be pitied.

A condition which we are now meeting, is what is known as sacralization of the fifth lumbar transverse process, that is the process in its complete form assumes the characters of a sacral buttress. The converse is sometimes encountered, lumbarization of the first sacral buttress not a sixth lumbar body, another abnormality which we occasionally meet.

The lumbo-sacral area is a mine of congenital abnormalities of which sacralization of the fifth lumbar transverse process is an important one. The frequency with which the area is now examined radiographically and no examination of a patient with a back complaint is complete without an X ray picture, no doubt accounts for the numerous reports of cases which are being published. Some observers estimate the frequency at 31%. Dr. Adams, an American surgeon, I think, was the first to describe the process and he thought it was the cause of so-called sciatic scoliosis. Since then numerous orthopaedic surgeons, mostly Americans, have recorded their experiences of the condition.

The process when a pathological entity, gives rise to more or less definite symptoms and signs, but without an X ray picture, I doubt whether any surgeon would be sufficiently sure of his diagnosis to recommend an operation.

Types.

There are various types of completeness of the deformity.

The abnormality may be unilateral or bilateral, complete and incomplete on both sides or complete on one and incomplete on the other. Then occasionally we meet companion abnormalities, in incomplete fusion of the laminal and spinous process as shown in Figure III. The sacralized process is analogous to cervical rib formation and not unlike this abnormality usually gives rise to a disability in third decade of life, when the body is becoming set. The adoption of faulty posture at this period is the exciting cause or again a definite trauma is sometimes the cause. It is difficult to see how the incomplete forms can give rise to symptoms when a stereoscopic skiagram does not show any impingement of a process on the ilium. The explanation must be that there is an upset of the normal posture with deviation or rotation and a consequent narrowing of the foramen for the fifth roots which then becomes slightly compressed. Calcification of ligaments, osteophytic outgrowths and inflammatory exudates have been recognized as causes of compression.

Symptoms and Signs.

Most of those patients whose condition has been investigated, have had a long period of disability,

which unlike that of some other lesions is constant but seldom severe. We must admit that the process can be a cause of disability, because a great number of patients have been operated upon with complete relief from pain after removal of the process. The process may produce the syndromes of (i) arthritis, (ii) compression of the fifth lumbar root or (iii) a combination of both.

Usually the complete types give rise to the arthritic syndrome, local pain, limitation of movements and the deformity of deviation away from the affected side which is Nature's attempt to relieve part of the stress and strain. In those cases the process impinges on the ilium and in two of my patients I found a definite roughening of the ilium. Some observers have found a definite bursal formation, separating the ilium and the end of the process.

In the incomplete types the neuritic symptoms predominate, local pain and referred pains, with sensory changes and occasionally a paresis of *tibialis anticus* can be made out.

In bilateral cases I find invariably that the patient complains of only one side, usually the incompletely sacralized side. Observers ascribe this to the fact that anatomically the completely sacralized side is much the stronger, therefore less liable to strain and its sequelæ.

Arthritic Group.

There is a complaint of constant annoying pain in lower part of the back; on one side the patient can localize it accurately to the ilio-lumbar angle and pain is aggravated by movement.

Every patient under examination should be stripped for inspection. There is usually a list away from the side of the process, an attempt to divert the body weight off that side. One observer noticed that in his series the list was away from the affected side in the more acute conditions and towards the affected side in chronic cases. The back is also flatter than the normal. On palpation tenderness on deep pressure is discovered in the ilio-lumbar angle.

Movement.—Forward flexion is limited with pain—lateral flexion towards the side of the lesion is limited with pain and away from the side of the lesion is usually free.

Special movements, such as raising of the leg of the affected side with the knee extended, are painful. Compression of the blades of the ilium is not painful. Rocking of the sacro-iliac joints is usually painful on the affected side.

Neuritic Group.

The patient complains of pain in the lower part of the back on the affected side and also of neuralgic pains in the back of the thigh and outer side of the leg. The pains are aggravated by coughing, sneezing and such like jarring movements. The list may or may not be present. Pressure applied in the ilio-lumbar angle aggravates the pain. In any examination "tenderness" is a valuable sign. In examination of these painful back patients, if tenderness is found to be present in the inferior sacro-iliac region, it suggests a sacro-

iliac lesion. If present in the sacro-sciatic notch, it again favours sacro-iliac lesion. If present over the sciatic nerve in the buttock, it indicates only a neuritis. If it is over the lumbar sacral articulation, in the centre, it favours lumbo-sacral disturbance and if present laterally in ilio-lumbar angle, indicates sacralization or strain of ligaments.

The anterior tibial muscles are painful on pressure. Forward and lateral flexion movements towards the affected side are painful; the pain increases, as the space for the nerve in the region of its exit from the foramen is decreased by the movements and the pressure is increased.

Perhaps it would be as well to consider the relationship of the nerve roots to the bones of the parts. The fifth lumbar nerve root after it emerges on its inner side is in direct contact with the side of fifth lumbar vertebra and the intervertebral disc and lastly the superior, anterior surface of the ala of the sacrum. The upper boundary of the foramen is the inferior surface of the process and externally are the ligaments. The fifth lumbar root is the largest of all and yet Nature has seen fit to provide it with the smallest foramen; the other foramina increase and the nerves decrease in size as we ascend, so that either by stretching or by direct pressure from exudates it would take only a little pressure in such a confined space to produce the syndrome of a compression neuritis.

The sacral nerve roots passing downwards and outwards are not in relation to any joint and except by pelvic growths or fractures of the sacrum with callus, would not be subject to compression. The upper lumbar roots are in close relationship to their processes. One observer, Bauman, has diagnosed compression neuritis of these higher roots, presumably following fractures of the transverse processes; after resection of the process neuritic symptoms have cleared up.

A spinal joint is supplied by two nerve roots, a filament from the root above and a filament from the root below, so that referred pains may be felt over a wide area. If the sacro-iliac joint is involved, it is possible to have pains over the areas supplied by the fifth lumbar, and first, second and third sacral nerves; it is usually limited to the areas supplied by the first and second sacral nerves. Whereas if the lumbo-sacral joint is involved, the pain is referred over the areas supplied by the fifth lumbar and the first sacral nerve.

The combination of pain, local and referred, with tenderness is the most important sign.

To revert to the examination, it will be found that sensation is dulled over the outer side of the leg—the area supplied from the fifth lumbar root and that there is a weakness of the *tibialis anticus* and a diminution of the *tendo Achillis* reflex.

Diagnosis.

Back ache is only a symptom. The cause has to be found and the finding is difficult. Besides sacralization as a cause the following should be considered: (i) Sacro-iliac strain and disease, (ii) lumbo-sacral strain and disease, (iii) spondylolisthesis, (iv) osteo-arthritis, (v) post fracture dis-

ability, (vi) static back ache, (vii) genito-urinary disease, (viii) pelvic disorders, (ix) malingering.

In this short paper the differential diagnosis must be omitted. It will be noticed that I have excluded sciatica from the list, because more often than not it is only a symptom of a disease. True sciatica does occur, but is rarely diagnosed by an orthopaedic surgeon. Before the diagnosis can be made the assistance of the genito-urinary and gynaecological specialist may be needed and a good X ray picture of the area will be required. If the examination is commenced with an open mind and the surgeon proceeds methodically, he will arrive at a creditable diagnosis. Hit and miss will not do in this region.

Prior to the routine which has been described, a careful history must be taken. Pain may be the only symptom, but its onset and character will be a help. It may be constant or intermittent, localized and referred, dull boring, throbbing, sharp and acute, but wherever it is, it is a sign of nerve involvement and it is the outward expression of a pathological condition within; its severity should be proportional to it.

If there has been an accident, fall or strain, the surgeon must determine which way the body was placed when the strain was applied. For instance, a patient sitting down hard with body flexed or thrown forwards would be likely to strain the lumbo-sacral joint, but if force were applied obliquely, the sacro-iliac joint would come under strain. It may have been noticed, at any rate in the case of miners' back strains, that they occur usually towards end of a shift, when fatigue is setting in. The reason for this is that the muscles are the first line of defence against strain and once fatigued they do not set up the instantaneous protection spasm required in emergency; the full force then falls on inelastic ligaments and something has to go.

Treatment.

The treatment is essentially operative, but it is always wise to try a period of rest combined with physio-therapy if the diagnosis is at all doubtful. Rest should be taken on a Bradford frame, with a lumbar support. If pain disappears, the patient may be allowed to get about, provided with a pelvic belt.

The operative treatment has given excellent results and it is very cheering to read the results of men who have treated fifty or sixty patients and to note the very large percentage of cures. My own little list is comprised of four cases and another surgeon operated on a fifth patient, a total of five. But I am more than satisfied with the results. The first three patients were completely relieved and able to resume their full occupation free from disability within six months. The fourth, a big, heavy woman and the fifth recovered only at the end of a year and in the case of the woman, after supplying her with a pelvic support. In the woman's case besides sacralization, the X-ray pictures revealed the sacral ala to be divided into three processes, a form of lumbarization and an inherently weak type of joint. I would hesitate to operate again in this type of case.

The operation is not an easy one, especially in fat people, as the process lies at a considerable depth and in the early stages of the operation, hæmorrhage is troublesome. There are two types of operations; in the first the process is exposed by splitting the *erector spinæ* muscle in the direction of its fibres and gradually working downwards in the ilio-lumbar angle to reach the process, which by the way is not always so easy to locate, being situated deeply. The non-touch technique does not apply to this operation. Once located the process is freed of its ligaments and removed with a chisel.

One must remember the danger of injuring the fifth lumbar root. This can be avoided if the blade of a thin, narrow, right-angled retractor be placed behind or rather on the anterior side of the process prior to chiselling.

In the other operation exposure is obtained by a subperiosteal stripping of the lumbar and gluteal muscles from posterior to the crest of the ilium. A segment of bone five centimetres long by two and a half centimetres wide is then cut out of the ilium and the process will be found to be exposed. It is then freed from the ligaments and removed by chisel.

In some cases the operators have ceased after removing the piece from the ilium. They argue that if impingement were taking place, when the outer wall is removed, impingement cannot take place. At any rate, the pains were relieved.

In patients with neuritic symptoms it would be necessary to remove as much of the process as possible as well.

The post operative treatment consists in keeping the patient in bed or on a frame for three or four weeks and then to apply physio-therapy with a graduated course of back exercises.

I shall conclude with a short note on each case which came to operation. I might say that during the past three years I have found the abnormality present in about twenty patients. The youngest was a child of two years who had a bilateral complete sacralization.

Case Records.

CASE I, a male, aged twenty-two years, a striker on the railways had had a constant dull ache in the lower region of the back on the right side for five years.

There was a list to the left side, with tenderness in the right ilio-lumbar angle. Pain in this region was present at the limits of the forward and lateral flexions. There were no signs of abnormality in the nervous system.

X ray examination revealed incomplete sacralization on the right side.

The patient was admitted on August 8, 1924, operated on on August 9 and discharged on September 5, 1924.

He was free from pain within a week and returned to usual employment in October, 1924. He has had no recurrence of pain.

CASE II, a male, aged thirty-one, a commercial traveller, complained of sciatic pain in his right leg. In six years he had had recurring attacks of sciatica and a persistent dull ache in the lower part of the back as well as pain on the left side.

He held his back in a slightly bent forward position. There was tenderness over the region of the fourth and fifth transverse process on each side, but most evident on the right side. Movements of forward flexion and lateral to the right side were very restricted. Lateral flexion to the left was also restricted by pain. There were

diminished sensation to pin prick over the fifth lumbar area and definite weakness of the *tibialis anticus*.

Bilateral complete sacralization was detected in the skiagram.

The operation was performed on January 24, 1925. The process was removed. The process had roughened the adjacent surface of the ilium. The patient had a good deal of post-operative discomfort, but was free from pain within two weeks. The wound did not heal for six weeks. A hæmatoma formed and became infected with a low grade infection.

He was admitted on November 7, 1924, and discharged on April 22, 1925. Three months later he returned to work and has been doing a heavy traveller's run ever since and is quite free from pain.

CASE III, a male, aged twenty-six years, a medical practitioner, had had chronic backache for several years; the symptoms were getting worse with pains in the back, the left thigh and the outer side of the leg.

There was a slight list to the right side. There was tenderness in the ilio-lumbar angle; forward flexion was full but not comfortable. Lateral flexions to the left were more limited than to the right. There was diminished appreciation of pin prick over the outer side of the leg. No weakness of the anterior tibial groups was detected.

An operation was performed in August, 1925. The left fifth process was removed. The end was found to be hard up against the ilium, the adjacent surfaces being roughened. A good deal of post operative discomfort occurred from distension of the bowel and for two weeks there was a hæmatoma and discharge. He left the hospital within four weeks, quite free from pain and has been so ever since.

CASE IV, a female, aged forty-six, engaged in household duties, complained of a constant dull pain in the lower part of her back on the left side for twelve years. It was worse on jarring.

She was a large, fat woman with a pendulous abdomen. There was definite tenderness on the left side in the ilio-lumbar region. All movements were restricted. There was no nerve involvement.

The skiagram revealed lumbarization of the sacral buttress. There was incomplete sacralization of the fifth lumbar process. The patient was first placed on a Bradford frame with pelvic strapping, but was not relieved. At operation on October 4, 1925, the process was found to be firmly wedged against the blade of the ilium, the distal half was removed. Pain was not relieved for several weeks and weakness persisted until a special sacro-iliac belt was fitted. At the end of a year the patient was quite comfortable, but must wear a belt.

CASE V, a patient Mr. Kenneth Mackenzie operated upon in 1924 was a labourer, aged forty-five years. The notes cannot be found, but the following points are given from memory.

For years he had complained of chronic pain in the lower part of his back on the left side. He had an accident and the pain became worse. This was a compensation case.

A skiagram was taken and revealed complete left sacralization. The process articulated with the ilium. There was also incomplete fusion of the laminae of the first sacral vertebra. At operation this process was removed. The patient did not return to heavy manual labour until the lapse of a year, but remained free from disability.

Conclusion.

Sacralization of the fifth lumbar transverse process in its complete and incomplete forms can give rise to a disability. When lumbar, sacral and sacro-iliac joint disease can be eliminated, this condition is diagnosed. The confirmation is sought in the X ray picture. Operation should be performed and the process removed.

DR. C. NIGEL SMITH (Sydney) said that he had read the literature dealing with this subject and was not convinced of the necessity for operative interference. From 15% to

20% of normal people had the condition, but it caused no trouble.

DR. F. F. ULRICH (Timaru) said that he thought the idea of operative interference had been introduced into England by American surgeons during the war. It would be wise to have statistics showing how often the condition occurred without giving rise to symptoms.

DR. RENFREW WHITE (Dunedin) said that Goldthwait of Boston, considered that this was a common congenital abnormality. In his experience symptoms did not usually occur until middle life. He was inclined to the belief that the condition was postural, as it usually occurred in people of the short, thick-set type who had lumbar vertebrae of a uniform kind and in whom, therefore, the condition would be more likely to give rise to symptoms. Imperfect posture was a secondary factor and produced the symptoms.

DR. D. F. MYERS (Wellington) agreed that the condition occurred in approximately 20% of people without giving rise to symptoms.

DR. N. D. ROYLE (Sydney) said that he did not think the pain described was always attributable to this condition. There was a tendency to disregard sciatica as a separate entity, though in his opinion this condition did occur. The best approach to the transverse process, if operation were resorted to, was at the lateral edge of the *sacro-spinalis* muscle. Subluxation of the sacro-iliac joint was not uncommon; it gave rise to very similar symptoms. He had found the best treatment was to make a belt out of old motor car tubes.

THE PATHOLOGY OF OSTEOARTHRITIS OF THE HIP JOINT AS SEEN AT OPERATION.

By MARIAN A. RADCLIFFE-TAYLOR, M.B., B.S. (New Zealand),
Dunedin.

THE following remarks are confined to those cases of hip trouble occurring in adults, in which there is a characteristic deformity of the head of the femur associated with an equally characteristic set of clinical manifestations, and in which one joint only is affected.

Charcot's disease, syringomyelia, the end results of acute infective arthritis and the like are included.

Patients usually limp in with a stick complaining of pain, stiffness and limping.

Pain.

The pain may be in the hip joint itself or down the inner surface of the thigh. It is, however, not infrequently felt in the knee joint when the patient himself may be quite unaware that there is any trouble in the hip joint.

The pain is increased by walking or standing and may be very acute if sudden, unexpected movements are performed, for example if the foot catches in something, forcibly rotating the thigh.

It is only in the later stages that the pain becomes almost continuous and prevents sleep.

Stiffness.

Stiffness begins slowly and gradually increases, until these people are unable to put on their socks or lace their boots.

Limping.

The limp is that of an adducted and flexed limb.

Physical Condition.

On examination these patients present a characteristic picture. There is always lordosis of the

lumbar spine and the thigh is externally rotated, adducted and flexed and there is muscular wasting of the thigh and gluteal muscles, even in very early cases.

When the range of movement at the hip joint is tested, limitation of movement is noted in all directions, especially limitation of abduction and rotation, the latter being complete from a very early stage. All attempts to force the limb into internal rotation are painful.

Radiographic Appearances.

X ray pictures of these joints are characteristic and seem to be divided into two types.

In type 1 the general globular shape of the head and the general cup-shape of the acetabulum remain, but there is a collar of new bone at the margin of the articular surface of the femur and to a lesser degree at the margin of the acetabulum.

In type 2 the head of the femur has lost its globular shape and becomes flattened out in an umbrella-like manner, so that the collar of osteophytes encroaches on the neck of the femur.

In both types there is a general increased density of the deformed head and neck.

This disease has been known by various names: *Malum coxae senilis*, hypertrophic osteoarthritis, degenerative arthritis, *arthritis deformans*. It is an entirely different disease from rheumatoid arthritis.

Pathology.

The traditional pathology of the condition has been taken from dried museum specimens and is therefore a dead pathology. In practically all these descriptions the bony changes are stressed particularly, in fact almost exclusively, hence the description hypertrophic and the name osteoarthritis itself.

Just as the living pathology of the abdomen has owing to the progress of abdominal surgery and radiology amplified and extended the pathology of the *post mortem* room, so it is time that the traditional conceptions of joint pathology should be modified by the knowledge we are gaining through operative exploration and radiological studies.

Operation.

During the last two years I have studied thirty cases of this condition. In all the clinical findings and the X ray pictures have been like those I have just described. Sixteen of these patients have been operated on.

The Smith-Peterson incision was used, the skin incision was carried along the crest of the ilium from about ten centimetres (four inches) posterior to the anterior superior spine and was continued down the front of the thigh along the anterior border of the *tensor fasciæ femoris* to below the level of the great trochanter.

The *gluteus medius* was cut along the crest of the ilium about twelve millimetres from its attachment and reflected subperiosteally; the *sartorius* was reflected medially and the *tensor fasciæ femoris* laterally. In most cases it was also necessary to reflect the straight head of the *rectus*.

The incision in the capsule was made through the upper part, so that the Y ligament of Bigelow was preserved. As this was made, some glairy yellow fluid escaped, sometimes as much as seven cubic centimetres under pressure, showing that the disease is not essentially or necessarily a dry process as is frequently described (*arthritis sicca*).

A further incision was then made backwards along the cotyloid ligament and the hip was dislocated outwards. This was usually quite easily done if the head of the *rectus* was previously detached.

Condition of the Tissues at Operation.

A very good view both of the head and neck of the femur and of the acetabulum was then obtained. The most constant and striking feature was the appearance of the synovial membrane, yet this point is not emphasized in the usual textbook description of the disease.

The synovial membrane over the anterior aspect of the neck of the femur is a dusky red colour, with a coarse, villous appearance. There is considerable proliferation in this region and about half is not easily seen, as it is tucked away under the overhanging osteophytes.

There is similar proliferation of the synovial membrane covering the lower portion of the acetabulum, but there is never any behind the femur.

It seems likely that a considerable amount of the pain, especially that caused by forcible internal rotation, is due to the pinching or compression of this mass of inflamed synovial membrane on the anterior aspect of the joint.

Over the postero-superior weight-bearing surface of the head of the bone the cartilage is usually worn away, leaving a smooth surface of eburnated bone exposed. The rest of the cartilage of the head is far from normal. Instead of being a translucent, blue-milky colour, it is dull yellow, turbid and not translucent.

Instead of being pearly smooth, it is rough and fibrillated with irregular bosses and depressions between. The cartilage, however, which covers the marginal osteophytes, presents a marked contrast, for although it is covering pathological tissue, its appearance is normal.

The cartilage of the acetabulum is difficult to see, but it feels smooth as a rule.

The osteophytes consist of cancellous bone with a compact surface and are covered with cartilage of normal appearance. They have a very irregular edge. They are always larger on the anterior and inferior half of the articular margin of the head.

The changes in the acetabulum are similar, but less marked.

The villi of the synovial membrane are smaller. It is less congested, the cartilage is somewhat difficult to see clearly, but as a rule feels smooth and the marginal osteophytes are smaller.

Relationship Between the Pathology and the Clinical Findings.

What Causes the Pain?

In the sixteen patients who were subjected to operation, all complained of pain. Fourteen had

no pain after operation. In one it is too early to say whether or not pain will be relieved. The other case was a bilateral one. One hip only was operated on. There was relief of pain and then a return of symptoms. The fact that the other hip was involved caused the joint to be put to extra stress and mechanical strain and may have accounted for the poor result. In one patient suppuration occurred and the end result was ankylosis without pain. The inflamed synovial membrane is accumulated in such a position that it could not escape compression by the very movements which are painful on clinical examination. After the operative removal of the synovial membrane and osteophytes the pain is relieved. I do not think that pain is due to the pressure of the osteophytes against each other, because in the later stages of the disease when the osteophytes are wedged together so firmly that all movement is abolished, there is no pain. In some of the patients after operation there was actually an increase in the osteophytes and yet no pain. Therefore, I think that pain is due to the synovial membrane being compressed.

What Causes the Limitation of Movement?

Except in the last stages of the disease the limitation of movement is not due to locking of the osteophytes, but to protective muscular spasm, reflex from the inflamed synovial membrane. This can be shown when the patient is under an anæsthetic prior to operation. A greater range of movement is always obtained without any force being used.

What is the Essential Nature of the Cause?

Contrast this picture with that of rheumatoid arthritis. The joints here are entirely different, whereas in osteoarthritis the bony tissues are proliferating over the synovial membrane; in rheumatoid arthritis the synovial membrane is growing over the cartilage. In rheumatoid arthritis the proliferation of the synovial membrane is greater. It is thickened, oedematous and congested with frequent flakes of lymph. These changes occur, moreover, over the whole of the synovial membrane. On the other hand, in osteoarthritis the proliferation and congestion are not so evident and are definitely localized in the hip joint to the part of the joint where the osteophytes are most developed.

In rheumatoid arthritis there are no osteophytes at the articular margins. Instead of proliferation of bone and cartilage there is destruction of these tissues and the synovial pannus grows inwards. This occurs all round the edge of the cartilage. The cartilage becomes replaced by pannus in advanced cases. Not only round the edges, but also over the articular surface there are discrete patches where the cartilage has been replaced by granulation tissue.

I think that rheumatoid arthritis is an entirely different disease and that it is probably infective in origin. There is a similarity of a rheumatoid joint to a tuberculous one. Indeed, at operation on a tuberculous joint, when the disease is limited to the synovial membrane and there is no caseation, it is impossible to say, except by making sections,

whether the condition is tuberculous synovitis or monarticular rheumatoid arthritis. Further, rheumatoid arthritis in its clinical aspects closely resembles gonococcal arthritis which is known to have an infective origin. The experiments of Burbank and Hajopoulos, of New York, and of Rosenow seem to uphold the infective theory of rheumatoid arthritis. Osteoarthritis presents an entirely different picture from infective arthritis. Personally I am inclined to think that it is due to an entirely different cause. Looking over their thirty cases there are one or two points worthy of note.

The ages of these patients ranged from twenty-four to sixty-five years, the younger subjects having the umbrella type of head closely resembling the end results of Perthes's disease; there was a history which dated back several years. There was in this type frequently a history of accident. One man of twenty-four years had jumped from the loft of a stable when a boy of seven and had pain in the hip for a few weeks. Two others had had the hip squeezed while riding. All the older subjects fell into one class, having a globular shaped head. The disease came on slowly and gradually progressed without obvious cause or injury.

There were twenty-five men and five women.

All the men with two exceptions were of the heavy, stocky type who tend to put on weight in middle life.

It may be mere coincidence, but it is a point worth noting that they were without exception farmers and had therefore been accustomed to ride a lot. Two of the women lived in the country and had done a considerable amount of riding. The majority of these patients, therefore, gave either a history of accident to the joint some years before or a history of having constantly used the joint in an unusual position, such as that required for riding.

These joints all presented a picture which is similar in every detail to an osteoarthritis of the knee which we know comes on years after a mechanical derangement of that joint, for example, a torn semilunar cartilage or a fracture into the joint.

Is it not possible that osteoarthritis is due to long continued mechanical misuse of a joint?

DR. D. F. MYERS (Wellington) pointed out that the X ray pictures of some of the patients very closely resembled the end results of a healed Perthes's disease.

DR. LESLIE WILL (Christchurch) said that he thought some of these cases were the sequel to pseudocoxalgia. He agreed that the synovial membrane was the seat of the pain. Incorrect weight bearing was also a factor. He pointed out that in traumatic arthritis of the knee joint the synovial membrane grew inwards over the cartilage. He asked the speaker whether she considered that pain or stiffness was the principal indication for operation.

DR. N. D. ROYLE (Sydney) said that he did not consider that the pain was entirely due to the inflammation of the synovial membrane. The limitation of movement and the pain were caused by changes in the capsule. He agreed that the muscular spasm caused the wasting. He had noted that the occupation of the patients was farming and suggested that farmers as a rule neglected their teeth. He suggested that there might be some infective element in the arthritis.

Dr. J. RENFREW WHITE (Dunedin) said that he had seen the patients with the speaker and he too was inclined to think that the condition was not infective. It was monarticular in all and he wondered if it were due to the wearing out of the hip joint over a long period during which it was subject to slight traumatism, perhaps the result of faulty posture or early disease, such as Perthes's disease.

Dr. Marian A. Radcliffe-Taylor in replying said that in the younger patients she had regarded the condition frequently as a sequel to Perthes's disease in childhood; the symptoms had appeared in early adult life. The condition was monarticular in every patient save one in whom both hips were affected. There was no other sign of arthritis or rheumatic trouble in any other joint. Pain had been the chief indication for operation. She considered that the patient who had a pain in the hip with partial limitation of movement was in a better position for carrying on his occupation than one who had a moderate range of movement which constantly gave rise to pain. She showed skiagrams of patients who had been operated on. All the patients were free from pain and with the exception of those still under treatment they had been able to return to their usual occupations.

TUESDAY MORNING, FEBRUARY 8, 1927.

COMBINED MEETING.—SECTIONS III, V AND IX.

THE PREVENTION OF DISEASE IN INFANCY AND CHILDHOOD.

By ARTHUR M. WILSON, D.S.O., M.D., B.S.
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THE PROBLEM.

The subject of the prevention of disease in infancy and childhood will be approached and treated from the viewpoint of the obstetrician.

The causes of foetal "dead-births" are intimately related to the causes of neonatal deaths and of disease in infancy and childhood. Unfortunately, except from hospital statistics, owing to the inefficient registration and notification of "dead-births," the actual causes of the "dead-births" cannot be ascertained. The position would be greatly improved if a certificate showing the cause of the "dead-birth" had to be given with all viable foetuses.

The foetal existence may be divided into three stages, (i) antenatal, that is, in the quiescent uterus, (ii) intranatal, that is during labour, (iii) post-natal, that is after birth before the pulmonary respiration has been established.

Pulmonary respiration is the test to apply in deciding whether the foetus has been dead-born or not. The continuance of the heart beat is merely the extra-uterine continuance of the normal intra-uterine condition.

Foetal Death.

Foetal death may occur during any stage of its existence.

(i) In antenatal death, that is during pregnancy, the foetus is born in a macerated or mummified condition.

(ii) In intranatal death, that is during labour, the foetus appears quite normal.

(iii) In postnatal death, that is after labour but before the establishment of pulmonary respiration, the foetus is born with its heart still beating.

Causes of Antenatal Death.

The causes of antenatal death may be maternal. These include chronic nephritis, syphilis, the toxæmias, especially eclampsia, acute febrile infections, trauma, sudden shock or fright.

They may be placental. They include degenerative conditions of the placenta especially if associated with chronic nephritis, premature separation of the placenta with *ante partum* hæmorrhage.

They may be foetal. Very rarely is foetal death due to foetal conditions, but it sometimes occurs with malformations.

Chronic nephritis, syphilis and toxæmias are by far the commonest causes. Repeated habitual antenatal death of the foetus has been described. Sometimes no cause can be assigned, usually one of the three above mentioned conditions may be found. A full-time, macerated foetus in the absence of chronic nephritis, toxæmia or trauma is very suggestive of syphilis.

Intranatal Death.

Intranatal death is practically always due to asphyxia or birth injury.

Asphyxial Death.—Any condition causing interference with the placental respiration, will ultimately cause foetal death. If it is not severe enough to cause death, the foetus will be born in a condition described as *asphyxia neonatorum*. Owing to the disturbance of the placental respiration, there is an increase of carbon dioxide in the blood and the respiratory centre may be first stimulated before it becomes paralysed. As a result the foetus makes premature attempts at inspiration and may suck into its lungs *liquor amnii* or blood. This stimulation of the respiratory centre is more likely to occur where the interference with the placental respiration has been rapid.

The increased intra-thoracic pressure causes venous obstruction all over the body and if the condition persists, the cardiac centre is also paralysed and the foetus dies.

The causes of asphyxial death are: (i) premature detachment of the placenta, (ii) compression of the cord, (iii) compression of placenta, (iv) compression of foetus.

Deaths from injuries.—The commonest causes are head injuries, associated with cerebral hæmorrhage. Fractures of the bones, even if depressed, do not as a rule cause death, unless they are associated with cerebral hæmorrhage, the commonest accompanying lesion being a laceration of the *tentorium cerebelli*. One quarter of all intra- and post-natal foetal deaths, is due to injury, the remaining three-quarters are due to asphyxia.

Cerebral injury and hæmorrhage are usually caused by extreme compression and moulding of the head, but occasionally they occur in apparently normal labours.

The causes are as follows: In the first place, forceps delivery may be responsible, especially if much traction is used, also if forceps are applied

in the wrong position on the head and if applied too early before the head is well moulded. The tip of the blade, if it lies in the wrong situation, may actually cause a depressed fracture. A depressed fracture associated with hæmorrhage may also occur when the head is pulled past the promontory.

In the second place the injury may be caused by compression of the head in rapid delivery of the after-coming head in a breech. This may also occur during a precipitate labour.

In the third place it may occur with abnormally soft fetal heads, especially with premature infants and also in attempts to rotate a posterior occipital presentation.

Postnatal Fetal Death.

Postnatal fetal death is due either to occlusion of the respiratory tract by mucus sucked in by premature attempts at respiration or by paralysis of the respiratory centre either by asphyxia, birth injuries or drugs given late in labour (especially morphine).

The foetal death rate is alarmingly high as is seen in the following table.

TABLE I.—FETAL DEATH RATES IN VICTORIA AND AT THE WOMEN'S HOSPITAL, MELBOURNE.

Place.	Confinements.	Dead Births.	Per-centage.
Victoria (1923)	35,876	1,056	2.7
Victoria (1924)	36,139	1,087	3.0
Women's Hospital, Melbourne (1925-1926)	2,717	149	5.5

The causes of foetal "dead-birth" have been discussed in some detail, as minor degrees of the same causative conditions may cause neonatal death and a still lesser degree may result in some disability, disease or disorder during infancy and childhood.

Neonatal Death.

There is some divergence of opinion as to what constitutes the neonatal period. Some authorities reserve the term for the first fortnight after the birth of the child. On the other hand it is much more convenient to count this period as extending over the first four weeks as undoubtedly the commonest causes of death during this period are obstetrical rather than nutritional.

It is quite obvious, however, that though many of the obstetrical causes of death are preventable, many are quite unavoidable.

In dealing with the causes of neonatal death the vital statistics are of some value as in these cases the obstetrician is required to give a certificate stating the cause of death.

Causes of neonatal death include under development of the vital centres owing to prematurity, especially if associated with malnutrition of the infant due to some existing maternal disorder, especially toxæmia of pregnancy, syphilis and chronic nephritis.

They also include malnutrition and debility of the infant owing to the presence of the above con-

stitutional disorders and birth injuries, especially cerebral hæmorrhage.

The severity of the problem of neonatal death may be gauged from the following table.

TABLE II.—SHOWING THE FREQUENCY OF NEONATAL DEATH IN VICTORIA AND AT THE WOMEN'S HOSPITAL, MELBOURNE.

Place.	Live-births.	Neonatal Deaths.	Per-centage.
Victoria (1925)	35,922	1,110 (first month)	3.09
Victoria (1924)	36,139	1,159 (first month)	3.21
Women's Hospital, Melbourne (1925-1926)	2,568	72 (first two weeks)	2.8

Of the 1,159 neonatal deaths occurring in Victoria in 1924, 75% took place within the first week.

The causes of death were given as follows:

Prematurity	568
Wasting diseases	137
Diarrhæal diseases	14
Bronchitis and pneumonia	47
Convulsions	27
Congenital defects	110
Syphilis	6
Violence	4
Other causes, including birth injuries	246

At the Melbourne Women's Hospital out of 152 neonatal deaths specially investigated, the causes of death were as follows:

Prematurity	60
Birth injuries	35

In considering the statistics of the State, I am strongly of the opinion that the proportion of deaths from birth injuries is greater than would appear. The classical signs and symptoms (increased tension of the anterior fontanelle, head retraction, convulsions, meningeal cry), are often absent. The baby may lie perfectly quiet and flaccid, refusing to suck, the anterior fontanelle may be depressed and there may be rapid loss of weight. The cause of death in such a case is frequently given as congenital debility, heart disease or malformation.

Here again the question of neonatal death has been somewhat fully discussed, as it is quite evident that many infants, after surviving some neonatal illness or disorder are condemned therefrom to various diseases and disabilities not only of childhood, but also of adult life.

The problem to be solved may be approximately stated to be as follows: For every hundred births, there are three dead births; of the surviving infants another three die within the first month; another two die within the next eleven months, some a result of neonatal disturbance, others from nutritional and infectious disorders.

The prevention of the "dead-births," neonatal deaths, and a small proportion of the deaths occurring within the one to twelve month period are in the hands of the obstetrician, the remainder in the hands of the paediatrician. In comparing infantile vital statistics, especially as regards dietetics, a much fairer test is the mortality in the

one to twelve month period, as I believe that very few of the deaths occurring during the first month are due to improper feeding, though undoubtedly the foundation of the nutritional disorder is laid more frequently during this period.

THE PREVENTION.

The three cardinal rules of obstetrics are: (i) care in the antenatal period, (ii) care in the intranatal period, (iii) care in the postnatal period.

We all do not have the same operative ability or manual dexterity, neither do we all possess in equal degree that indefinable quality known as "brains"; yet we should all have an equal capacity for being careful with our patients.

In obstetrics carefulness counts more on most occasions than skilfulness. I believe that at present the great hope of improvement in the foetal (and also maternal) mortality rate lies in the development of a strong obstetric conscience in all practitioners and nurses and in the education of the public to seek efficient medical and nursing attention under suitable conditions.

Antenatal Care.

During pregnancy the border line between the physiological and pathological is very slender, therefore all patients must be carefully watched for the appearance of the pathological.

Dame Janet Campbell's words are worth quoting:

Until antenatal supervision is accepted by patients and their advisers as the invariable duty of the professional attendant engaged for the confinement, we shall never make substantial progress toward the reduction of maternal death and injury. It is the key to success in any scheme of prevention and it must be insisted on, until it is recognized as a necessary and integral part of the management of every confinement case.

The details of the routine antenatal examinations have been so frequently discussed that it is hardly necessary to reiterate them. However, a note of warning should be sounded. Antenatal care should not mean increased interference on the part of the obstetrician. The early diagnosis of some pathological condition should in many cases enable the obstetrician by treatment once again to convert the case from the abnormal to the normal and thus should limit the appearance of an acute obstetrical emergency necessitating some hasty, drastic treatment.

Very briefly may be mentioned the most important conditions which should be sought for: Disproportion, pelvic deformity, malpresentations and malpositions, toxæmias of pregnancy, constitutional complications of pregnancy (especially chronic nephritis), cardiac and pulmonary disease and venereal disease.

Limiting the further remarks to the constitutional disorders, I would like to lay great stress on the importance of chronic nephritis during pregnancy. Apart from the danger to the mother, chronic nephritis is one of the commonest causes of premature labours and of dead-births.

During the year 1925-1926 at the Women's Hospital, Melbourne, out of twenty-eight maternal deaths, eleven were in women in whom there was

evidence of chronic nephritis or toxæmia. This was confirmed at the *post mortem* examination.

With regard to the venereal diseases the treatment of gonorrhœa during pregnancy is most unsatisfactory. However, by prophylactic treatment the incidence of *ophthalmia neonatorum* should be negligible. During the puerperium, gonorrhœa, whilst being a potent cause of maternal morbidity, is not a great cause of maternal mortality. Syphilis presents a most interesting problem. Fowler and Fairley reported in THE MEDICAL JOURNAL OF AUSTRALIA of December 24, 1924, a series of 750 consecutive Wassermann tests done on patients at the Women's Hospital. In 53 (7.5%) a reaction was obtained.

These figures agreed closely with a smaller series taken at the Women's Hospital some years previously by Allen Robertson. The most striking fact elicited was the latency of the condition. Many of the pregnant women could give no history of infection. They had no symptoms and showed no signs and many of the infants appeared quite healthy at birth.

There is only one solution of this problem. The Wassermann test should be carried out on all women attending the antenatal clinics and also the foetal blood obtained from the umbilical cord could be tested. The expense and the technical difficulties would be great, but the return would be far greater.

Incidentally Fowler and Fairley showed the practical impossibility of converting the response to the test from a reaction to a failure to react during pregnancy. Nevertheless, efficient treatment would undoubtedly improve the prognosis both for mother and child.

The value of antenatal care is well exemplified by the results obtained at the Melbourne Women's Hospital last year.

Form of Treatment.	Number of Cases.	Maternal Deaths.	Foetal Deaths (Dead Births and Neonatal Deaths).
Antenatal	1,281	2	84 (6.6%)
Emergency	1,399	26	137 (10%)

Intranatal Care.

Watchful expectancy and masterly inactivity on the part of the obstetrician will bring most cases to a successful termination. Nine cases out of ten will be perfectly normal, if the patients are only left alone. The normal woman will be much better off without a doctor than with one that interferes unnecessarily. The abuse of the obstetrical forceps leaves behind a ghastly train of dead, dying and damaged infants.

This is neither the time nor the place to enter into a dissertation upon the uses and abuses of the obstetrical forceps, yet the commonest causes of difficult forceps deliveries may be mentioned: (i) Premature application of forceps, (ii) faulty application of the forceps, (iii) unrecognized disproportion.

The prevention consists in waiting until it is apparent that no further descent of the fetal head will occur, in the correct application of forceps and in antenatal supervision.

Too often is it assumed that because a *primigravida* has entered the second stage of labour, she is "ready." There is only one almost safe forceps operation, the head-on-perineum operation.

Especially should two types of fetuses be delivered without forceps, if possible, the premature fetus and the fetus with the abnormally soft head.

Whilst admitting that birth injuries associated with cerebral hæmorrhage do occur in normal deliveries, nevertheless it must be admitted that the majority occurs with forceps and breech deliveries. The elimination of these injuries would limit to a great degree many of the neonatal disasters and the disorders and diseases of infancy.

Postnatal Care.

Unfortunately there is a tendency amongst some obstetricians to regard their work as finished once the infant has been safely delivered; their subsequent attentions are devoted to the mothers, whilst the infants are left to the tender mercies of the nurses.

The causes of death during the postnatal period are mainly obstetrical. This period marks the commencement of various nutritional disorders which may cause many months of disease and disorder in infancy and childhood.

The importance of breast feeding cannot be overestimated. In many infants after an exhausting and difficult labour the sucking reflex may be weak owing to some slight cerebral hæmorrhage or œdema. Unfortunately, in many cases it is assumed that the breast secretion is at fault and the infant is promptly put on to some artificial food, whereas with the exercise of some patience this difficulty would be overcome.

Here also must be deprecated the indiscriminate giving of castor oil, brandy, artificial foods during the first week of the infant's life.

A few of the commoner neonatal disorders may be mentioned. The immense death rate in premature infants calls for some comment. Undoubtedly the slender chance of survival in many of these infants is lost in the first five minutes subsequent to their birth. They are allowed to get cold and the greatest difficulty is then experienced in getting their temperature up again. A warmed blanket and crib should be prepared before their arrival, and immediately after birth the infant should be wrapped up in the blanket, whilst the obstetrician waits for the cord to stop pulsating. It is astonishing how well these infants do, even in spite of severe syncopal attacks during the first few weeks, provided that efficient care is given to them. In my own practice I never give brandy to premature infants.

With regard to the treatment of cerebral hæmorrhage in the new-born I have seen infants improve and survive after a lumbar puncture, but I have yet to see one that has grown up into a perfectly normal child.

The *morbus hæmorrhagica neonatorum* is very satisfactorily treated by muscular injections of the mother's whole blood. Umbilical sepsis accounts for far more deaths and ill-health during the antenatal period than is usually supposed and consequently in the management of the stump-cord, rigid aseptic precautions should be adopted.

In conclusion, I should like to call your attention to the following table which has been copied from Dr. Marshall Allan's interim report on maternal morbidity and mortality in Victoria.

Period.	Number of Deaths per Thousand Births.		
	Under One Month.	Under One and Under Twelve Months.	Under One Year.
1881-1890	37.2	89.4	126.6
1891-1900	33.8	77.9	111.7
1900-1904	34.3	68.7	98.0
1905-1909	32.9	48.0	80.9
1910-1914	32.6	41.2	73.8
1915-1919	33.4	32.7	66.1
1920-1924	33.0	32.3	65.3
1925	30.9	26.1	57.0

It will be noted that the number of deaths under one month has remained practically constant, whereas the number over one and under twelve months has been considerably reduced. It has been remarked that the chief cause of death in the first month is syphilis and slovenly obstetrics and in the next eleven months food and flies.

The pædiatricians have accomplished much; the next great improvement in the infant mortality must come from the obstetricians and this can be obtained only by the exercise of increased care during the antenatal, intranatal and postnatal periods.

THE PREVENTION OF INFECTIOUS DISEASES OF SCHOOL LIFE.

By HARVEY SUTTON, M.D., B.S. (Melbourne),
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THE prevention of infectious diseases of school life is of peculiar importance. Every child, boy or girl, in the civilized globe between the ages of seven and fourteen must attend school. The provision of medical examination and health supervision in more or less complete measure is universal throughout the Empire. The opportunity is thus provided for the study of the life history of the human being during about one third of the growth period of existence. The advantage is gained of using the convenient statistical method of taking a cross section of the population representing one fifth of the total population. Not only are trained clinical observers at work, but considerable data are available from the close control of the teaching staff (about one to every forty children) and the records and experience of well organized, smoothly running educational departments.

A vast body of evidence is being collected about the human child to an extent far exceeding any

attempt at any other life period and rivalled only by the data obtained from special defectives, such as the insane, or in special groups such as the Navy and the Army.

The subject selected has been chosen for several reasons. The control of infectious diseases in school life is still incomplete, and the reasons for this partial failure are worthy of analysis. The need exists for defining more exactly which are the infectious diseases of school life and which are shared with other life groups. The study of the susceptibilities, morbidity and mortality of the school child throws light on the methods of prevention both antecedent and in the future. "We look before and after and pine for what is not." It is not intended to present any new hypothesis, but rather to show how "experience has been fallacious and judgement difficult." School health is a subject in which knowledge has outstripped practice and departmental knowledge and methods are both in advance of the opinion of general medical practice. If the general medical practitioner is to fulfil the duties and responsibilities of his profession, it will be necessary for him and for others to recognise his vital importance as the frontier line of public health and preventive medicine. It would seem advisable to review past efforts of control and to outline modern methods and evaluate their importance and in all this unity of principle and co-operation in practice are supreme.

The school life which became compulsory about 1880, claims the child for a minimum of seven years, seven to thirteen inclusive, and often, especially in cities, from four and a half to eighteen. About one fifth of the population are in school for five or six hours for forty-two weeks of five days or two hundred and ten days a year. Though an artificial confinement of the child results, it should be remembered that for the majority of human beings the larger part of this period before compulsory education was spent in wage earning employment, as in China to-day. Compulsory education spells the doom of child labour.

The dependent period of life should probably be about one third of the average lifetime, so that the school leaving age might well be raised at least four years, from fourteen to eighteen, owing to the increased length of life in the last forty years and this is readily feasible as more wage earners over eighteen exist in proportion to the population as did at the inception of compulsory education.

The school age is noteworthy for certain changes occurring in the human being of profound biological interest. The hypermetropic eye is becoming normal sighted. It is noteworthy that myopia is uncommon in Australia (scarcely more than 1%). The skeleton is steadily ossifying and epiphyseal lines disappearing. The height increases from forty-two or forty-four at five to six years to sixty at fourteen; while the height increases by 50%, the weight more than doubles from forty pounds to ninety pounds. The growth thus occurring is not uniform but in cycles. Girls start to grow more rapidly about nine, matching the boys who were previously taller and heavier, at eleven and grow fastest about the thirteenth birth-

day, after which the speed of growth rapidly lessens to practically nothing at sixteen. The girl should be one pound to the inch at seven, one and a half pounds to the inch at fourteen and two pounds to the inch at twenty-one. The boy does not put on the pace till thirteen, is growing most rapidly at fifteen and a half, a point at which his caloric requirements exceed the adult, and practically ceases at eighteen, ending up four inches taller and twelve pounds heavier than the girl. This variation in growth speed is probably a secondary sexual phenomenon as the "mode" in appearance of menstruation occurs at thirteen and 80% of girls have reached puberty before their fourteenth birthday.

Failures in growth function, so-called malnutrition, are closely associated with the appearance of anæmia, neurasthenia and tuberculosis. It is noteworthy that the curve of mortality for tuberculosis rises abruptly with the termination of growth in the respective sex. Acute rheumatism and chorea are also closely bound up with this active growing period.

Just as growth is not uniform in its yearly progress, so rhythm is evident in the monthly growth or seasonal growth. Studies in monthly increase of growth at the ages six, seven, eight and nine in Sydney confirm Fitt's findings. Contrasting the five months of the school year, February to June, as against the succeeding five months, July to November, we find the child puts on five times as much weight in February to June than in July to November. The abrupt drop in the increases at July to August is very striking and is not explained by considerations of diet, clothing, exercise, temperature and so forth. It is perhaps a deep seated biological phenomenon and apparently July to August is a period of instability. At this point of the year attendance at school is prone to be seriously disturbed by the respiratory tract infections as influenza, "colds," bronchitis, bronchopneumonia and sick leave in teachers is considerable in extent.

Other growth phenomena include the change from the primary temporary dentition to the permanent dentition. The transitional period begins with the appearance of the six-year-old molar and all deciduous teeth have usually disappeared before the appearance of the twelve-year-old canine and the fourteen-year-old second molar. This is the most unstable period in dental development and caries tends to be at its maximum. Septic mouths become prevalent and must have a considerable influence on the whole problem of the infection of the mouth, nose and throat.

Apart from these growth phenomena many differences characteristic of childhood are noticeable. The dirtiest period of life is probably about the eleventh year, the child is becoming too active and escaping the attention of its mother and has not yet learnt to look after itself, hence minor contagious or dirty hair conditions then tend to appear most frequently, such as pediculosis, scabies, blepharitis, impetigo. Ringworm is strangely almost entirely limited to

the primary school period. Truancy and delinquency, examples of relativity in behaviour, belong essentially to the school period and in older girls are closely associated with venereal disease. In contrast with these school age susceptibilities other conditions found in school children date back to the earlier ages, though they may be accentuated and occasionally even originate at the school period. Chief of these are rickets, asthma, migraine, epilepsy, stammering and squint. On the other hand, hysteria, suicide, *dementia præcox*, boils, acne, *coxa vara*, scoliosis and flat feet belong to the adolescent period, while appendicitis first rises into prominence in the later school ages (after ten years).

If we turn now to the more definitely infectious types of disease, the infectious diseases commonly found in school life fall naturally into three main groups, diseases of the pre-school period (0-4 inclusive), diseases of the school ages (5-9 and 10-14 inclusive) and diseases of adolescents and young adults (15-19 and 20-24).

The first five years include three or four groups:—

(i.) The first month of life the result of antenatal failures (congenital malformation and debility, prematurity) and intranatal effects (injury at birth). The chief infectious disease at this period is syphilis, congenital, not inherited in origin, while tuberculosis is rare.

(ii.) In the next eleven months comes the early rise of infections by Flexner-Shiga and allied gastro-enteric types of organisms in the summer and of the influenzal bronchitis and broncho-pneumonic types in the winter.

(iii.) The influence of the latter is carried on into the October-November type whooping cough which is most fatal in the first year of life, though common throughout childhood. Measles also is prominent in the latter six months. Tuberculous meningitis and acute miliary tuberculosis, tetanus, erysipelas and epidemic meningitis are all heavy mortalities of the first year of life, heavier than in any succeeding year.

(iv.) Isolation of the baby in epidemics is deserving of more attention.

The second to the fifth years (one to four inclusive) are the focussing point of attack for most of the common infectious diseases of childhood. The chief susceptibility, morbidity and fatality are in the pre-school ages, whooping cough in the first year, measles in the second year, diphtheria in the second and third year, scarlet fever in the fourth year, lethargic encephalitis and anterior poliomyelitis in the fifth year of life. Varicella, small pox (in unvaccinated populations) and German measles also belong to the pre-school period.

The tale of mortalities is confirmed by special investigations into susceptibility, such as by the Dick test and the Schick test; the Schick test places the maximum susceptibility of children for diphtheria in the third year of life.

Stress has been laid on the pre-school age figures as supplying the keynote for future control. It is

obvious that though these diseases are frequently found in school children the concentration must be on the focus, namely the pre-school age. Concentration in the past has been on the school child because of his accessibility and little has been done for younger children. Such measures can only command at best a partial success and it is in this direction that the explanation of the failure of the past is to be found. School closure for epidemics is still the first measure suggested by the general practitioner. It seems so obvious, here is a number of susceptible children in more or less close contact; prohibit the contact. Closure of schools after an extended trial of over a generation has universally proved a failure. The epidemic is either unaffected or in town conditions accelerated. The reason is not far to seek. The focus is in the pre-school ages. Closing the school increases the home contact of all children and the intermixture of children between homes with increased liability of spread. The only exception to this is in the instance of remote rural areas where the only meeting place of children is the school. In towns closure of the school means packed attendances at the moving pictures, so that even in its avowed intention of limiting the contact of school children it fails.

In the past seven years in New South Wales no school has been closed for epidemic disease. In a few examples the school has closed itself in remote rural areas, several families all being infected and in one construction camp the engineer and in one town the local policeman (under threat of arrest of the teacher), closed the school. Careful analysis of every case where closure has been recommended, only demonstrates further the correctness of the departmental attitude. The pre-school child over and over again provides the chief focus of infection.

It is not denied that infection can occur at school, but this is readily controlled by abolition of common mug (now prohibited in school), by introducing open air classes wherever possible, by making the school an observation centre. Teachers are instructed to watch for the earliest suspicious signs of illness, cough, "cold," sneezing and the like and promptly to exclude the child. If the suspected disease develops, the child has been eliminated at the earliest possible moment, while the exclusion usually spurs even the indifferent parent to activity and to consulting his medical attendant with benefit to the child and the epidemic. If it is a slight cold, the child is soon well and returns to school. To the harassed mother two children at school is as good as a servant in the house; the children are safe and well looked after. The sending of a child home is a calamity. Again, in diphtheria benefit has occurred from swabbing the throats of the school children and the elimination and control of carriers. Swabbing is only of full value if every family and every child is included, as has been successfully demonstrated at Broken Hill. In recent years the Schick test has been fairly extensively tried and susceptible children picked out by its use. The method has not yet reached a stage in which its usefulness may be gauged under our local con-

ditions. Officers of the Health Department with the assistance of the school medical staff, carry out tests in country centres where the shire council supports the idea. Written consent is obtained from parents, but many refuse and practically only school children have been submitted to the test. Those found susceptible have to go to the local practitioner for immunization; the Health Department supplies the material. At first the parent had to pay a fee and so went no further in the matter. Now the councils pay the doctor his fee (seven shillings and sixpence) and recover if they can from the parent. Better results are expected from this arrangement.

Great opportunities await the modern general practitioner in the home control of diphtheria. The use of antitoxin as a prophylactic for other members of the family, the swabbing of all noses and throats in the household to define the carriers, the Schick immunization of all children under five without preliminary testing and of all found susceptible over five can be employed. The development of a combined test and immunization dose should simplify matters.

The control of the patient by proper isolation and disinfection of discharges and his release only on careful bacterial testing of swabs should be always insisted on. The regular inspection of the throats daily of the young children and supervision of their separation from the patient should be added. An essential part of the medical *régime* in any infectious case should be direct home protection of the other children from the spread of infection. In dealing with the carrier the importance of adenoids and unhealthy tonsils as foci capable of surgical removal is important and the insidious character of nasal diphtheria must not be forgotten. In prolonged cases of carriers virulence tests are desirable. Terminal disinfection is of doubtful value. Diphtheria has been selected as an example of the pre-school diseases. Practitioners still exist who retain prehistoric ideas about drains, defective water supplies or infected buildings as causes of the spread of Klebs-Löffler infection. These may be classed as hopeless. For control we must await their demise. But the majority of practitioners consider it a matter of professional pride to treat the patient adequately, but few exploit the various avenues of prevention of spread of infection now available. No department can carry out these methods. At most it may provide isolation wards, antitoxin and immunizing material and laboratory facilities for diagnosis. When the practitioner considers these matters his direct responsibility, then and only then will control become effective.

Before finally considering the school diseases we may further eliminate the group characteristic of early adult life—tuberculosis, typhoid fever and venereal diseases.

Tuberculosis in Australia is a comparative rarity in school life and the mortality lower for pulmonary types than in either the preceding or following age groups and lower in non-pulmonary than at earlier ages.

Nevertheless school data impress the importance of two things: Firstly, the seriousness of the massive dose under family conditions. In half the cases in school children the source of infection was one or other parent. Every endeavour must be made in the future, whether by immunizing babies by Calmette's method or by the separation of babe and tuberculous mother as arranged by Graucher on the one hand, or on the other by reinforcing existent organizations by farm colonies of the Papworth type or by subsidizing the family of the father with chronic "open" tuberculosis, to prevent this creation and recreation of tuberculous infection in children. By the method of "following up" the school child much may be done to break this link in infection. Secondly, despite the fact that tuberculosis is at its lowest in the school ages, and that the school itself is a negligible factor in the direct spread of infection, one cannot but be impressed by von Pirquet's findings in children and the abrupt rise in active disease with the termination of the growth period. The tubercle bacillus lies in wait for the non-resistant human body, the body in a condition of so-called "malnutrition" and when the stress of early adult life comes latency and quiescence are changed to activity and the disease process is manifest; truly tuberculosis is the test of national nutrition.

Malnutrition is merely a name to the general practitioner for a condition of no importance. Nothing he can treat by putting the child to bed or operating on it. The child is not ill in any way and so it is passed by. Yet here is the opportunity for establishing a real state of fitness and perfect health, to execute repairs which will enable the young adult to weather the storm and stress of existence.

A reduction of the weight *per* height standard by 10% at least constitutes a *prima facie* case for malnutrition. If this is combined with pallor, flabbiness, lack of muscular and vasomotor tone, liability to fatigue and so forth, the diagnosis is complete. A sound hygienic *régime* is essential, fresh air and sunshine, adequate sleep and play, good food, rich in vitamins, milk, fruit and perhaps cod liver oil, satisfactory housing—all should be prescribed with or without iron. The child needs a thorough overhaul and any disturbing factor eliminated or controlled, such as adenoids, pyelitis, abdominal tuberculosis, eye strain, dental disease, heart disease. Every child has the right to grow up sound and healthy in body and mind and it needs careful examination and a thorough knowledge of paediatrics to explain his loss of that right and to restore it to him. The thorough attack on malnutrition would have and is having a marked influence on the early adult type of phthisis. It is the duty of the practitioner to take it seriously.

Venereal disease is very rarely a problem in school life. Education in a sound attitude towards the reproductive function may still influence for good many young people and at the pubertal period sex instruction should at latest be given. In delinquent girls (not in boy delinquents) venereal disease, chiefly gonorrhœa, is common after twelve

and is now being attacked by up-to-date surgical measures in Sydney. Otherwise gonorrhoea and acquired syphilis do not concern this period.

Typhoid or enteric fever is another disease of early adult life, but is fairly common in country children. Pending more adequate sanitation and proper fly campaigns, inoculation with typhoid and paratyphoid A and B vaccine might well be made the regular practice in children of school age in unsewered areas; no patient should be discharged from medical supervision, whether in private or hospital practice, until no longer a carrier of infection. Excretal tests and the Widal test are helpful here. The few persistent carriers would then be known, withdrawn from occupations which may prove dangerous, such as that of dairyman or milk vendor, and taught hygienic habits which would lessen the risk of spread of infection.

The legal power exists, but few hospitals or practitioners complete their treatment of patients with typhoid fever as they should by watching for the termination of infectivity. Hence, a constant proportion may be expected to exist in any community and so justify the golden rule of sanitation that no system of sanitation is satisfactory that permits the contact of the fly with infective material. Inoculation and carrier control are functions more for the practitioner than for the health officer.

By this method of elimination we may narrow down the infectious disease peculiar to the school age to acute rheumatism and chorea, mumps and minor infections such as ringworm, pediculosis, impetigo, discoid eczema and in special districts diseases such as ophthalmia (trachoma), thyroid gland enlargement and hookworm infestation.

Mumps is a non-fatal disease, occurring in pandemics every five or six years. Beyond a few troublesome symptoms, pain from orchitis, oophoritis and pancreatitis, it causes no serious disturbance. Its prophylaxis is quite indefinite. It is apparently most common at the school age because it takes five or six years before sufficient susceptibles have been born and grown up to school age. Simple nursing measures suffice in treatment.

Ringworm of the scalp is the usual form in the school child and is of no real importance whatever as to health or otherwise. It is much disliked by parents and teachers alike. It is, therefore, always excluded at first. Under ordinary methods of treatment the child often remains infected for many months. X-ray methods with rapid epilation and cure are indicated. A washable underlining to the cap should be worn. Although it may be spread by use of infected articles, scissors, razor, and by the exchange of infected articles as caps or hats and by the intimate contact common to children, little is known as to what decides infection and it is difficult to trace cases back to their original infection, nor does it necessarily spread through the family as one would expect. Rigid cleanliness and rapid effective treatment should insure improvement.

Discoid eczema, frequent on the face in windy, cold, changeable weather, is of no importance.

Hookworm has been very fully investigated by the Hookworm Campaign, its limitations to the 40 to 50 inch rain-belt north of 31° south latitude have been mapped out, its absence in irrigation areas and in mines, except a few in Queensland has been defined and its incidence in the school population (6%) defined. The index in school population, the barefoot ages, is about twice as high as in the rest of the population. Experience shows that useful though the recognition, treatment and disinfection of the individual may be owing to the long life (seven to ten years) of this worm, the essential need for permanent success is safe and universal methods of field sanitation and the prevention of soil pollution.

Certain general considerations concerning school closure and infectious disease of the pre-school period may be mentioned. At one time it was considered that a relationship could be established between school holidays and the fall in epidemic incidence of certain diseases such as scarlet fever. Further study, however, has shown that this is fallacious and that the seasonal incidence of these epidemic diseases dominates the situation and is quite independent of school vacations or school terms.

In 1919 a very curious phenomenon was observed. Influenza in the pneumonic form was epidemic in New South Wales. Although its chief incidence was not at the school age, it would appear to have influenced the incidence of the common influenza disease of children, the lowest number for ten years being away in that year from school because of infection, after full allowance has been made for the period during which the schools were closed.

Some importance was thought to exist in regard to findings which seem to show that the week end was freer from infection than the rest of the week, but incubation periods are somewhat variable factors and so destroy the value of such calculations. We are far from understanding what decides the cycles, whether seasonal or periodical, over a few years or over a number of years, which have been preserved in many of these conditions. At present the matter is purely one of hypothesis. The collection altogether of a certain mass of susceptibles being a much favoured idea and variations in birth rate may correspond to such calculations. The incidence of these cycles is well shown in the graph dealing with the cases reported in school children, considerable correspondence may be traced between these school cycles and the records of mortality in those diseases which are fatal in character.

Another idea of more general and widespread application, which is suggested by various data collected in regard to the Schick reaction and also to the investigation of tuberculosis is the idea that child development and indeed the whole fabric of civilization are markedly influenced, if not actually dependent upon the establishment of immunity to infectious disease. The suggestion is that immunity may be acquired by the child, not only by an actual attack of the disease or by a very mild attack, but by contact with minimal doses of the organisms

without the disease itself being contracted. The Schick testing for susceptibility shows very varying figures in the older ages in school, fewer susceptibles being found in communities where the disease has been prevalent and a larger proportion where the disease is not endemic, only a certain number of the immune, however, having had the disease itself.

Corresponding to the Schick test in diphtheria we have similar methods known as the Dick test in scarlet fever. In whooping cough, too, the prophylactic use of vaccine in contacts has been advocated. Neither of these methods have yet been tested satisfactorily in Australia. They are, however, full of hope for the future. It may be that part of human experience in the next generation will be to immunize young children in the same way as they immunize soldiers at the war against various diseases.

In fact, success in civilization is the index of created immunity and diluted dosage the solution for disease protection.

Another striking feature of these infectious diseases in recent times has been the all round reduction in mortality, most markedly seen in scarlet fever, also in measles and whooping cough. No investigation appears to have solved this problem of virulence, but it is striking that the reduction has been closely associated in those diseases in which no particular improvement in treatment has occurred with improved standard of cleanliness brought into existence by the great *Public Health Acts of 1875 et sequentes*.

While we do not know what proportion of deaths from organic heart disease is due to acute rheumatism, we do know that organic heart disease is the chief cause of death and acute rheumatism plays no small part in the genesis of carditis. The campaign against this disease of school life is, therefore, of great importance in the prevention of this most serious mortality.

Chorea has often been attributed directly to school life and stress. School stress certainly may accentuate the signs and symptoms. Its incidence runs parallel with that of acute rheumatism and probably depends on entirely the same cause, nervous instability; stuttering is common in acute rheumatism. Children with chorea when recognized are excluded from school till recovery occurs. Its frequency in girls is striking. It must be carefully differentiated from habit spasm and chronic chorea (sublenticular syndrome) both of which persist for years.

Chorea is not a common disease; it is probably less common in Australia than in England.

Rheumatic nodules quite commonly associated with acute rheumatism in England have been noted very rarely in Australia, though carefully searched for by many observers.

In conclusion, the attempt in this address has been to point out more clearly the age incidence of the chief communicable diseases of children and to demonstrate how this age variation in susceptibility,

morbidity and mortality is of fundamental importance in the problem of prevention.

The inferences drawn have been that the school by itself cannot control the majority of the epidemic diseases prevalent in the growth period of life, because education authorities cannot directly influence the pre-school ages, the chief focus of these diseases, that the school because of the marked influence on attendance and the far-reaching influence on healthy development, because of sequelæ such as adenoids, malnutrition, dental caries and the like, must co-operate with other health agencies in organizing and carrying out preventive measures in early life.

We have seen how early exclusion, not closure, is the school's chief weapon, how the school may serve as a collecting ground for sound statistics as in bookworm disease and acute rheumatism, how the educational machine may spread valuable information among parents, educate children in health habits, ideas and ideals and create healthy minds in healthy bodies for a healthy life in a healthy world.

Studies of the human life history during school life reinforces efforts of prevention both in infants and in young adults. Above all the general practitioner stands out as our chief health agent. Handicapped as he has been in the past by neglect in medical education to train him adequately in diseases of children and in public health, he will not fulfil his true function in the community until the idea of prevention permeates every subject in the curriculum and until preventive medicine as an applied science attains a proper status at the university. With confidence in the practitioner we must associate faith in the dictum of Pasteur that it is in the power of the human being to eliminate every form of infection from the human being. In striving towards that ideal the periodic medical examination of school children and the medical and health supervision possible in school life will, I believe, prove our main standby for the future progress and well being of humanity.

THE PREVENTION OF DISEASE IN INFANCY AND CHILDHOOD.

By A. JEFFERIS TURNER, M.D.
Brisbane.

The prevention of disease depends on research and the practical application of the results of research. We want more research, but more urgently do we want a general application of what is already known. Our practical needs may be classified under three headings according to age.

The Mortality of the First Month.

The mortality in the first month is little influenced by infant welfare work. In a fairly constant percentage infants are so illborn that they either die early or worse still survive as bodily or mental defectives, a grievous affliction to their

parents and an economic burden to the State. We cannot do all we could wish. That too common condition known as mongolism, for instance, is still one of the obscure problems of pathology, but it has some relationship to depressed conditions of maternal health. Antenatal supervision and treatment, for which we must look to the obstetrician, should save us from a great deal of infant wreckage and parental misery. In the first place I would place syphilis. With our present knowledge few if any children should be born syphilitic. Blood tests should be a routine practice in pregnancy and every positive reaction to the Wassermann test should lead to efficient preventive treatment. Where syphilis is clinically present, the blood test might be omitted.

The antenatal clinic should also lessen this mortality by lessening maternal eclampsia, premature delivery and birth injuries. Furthermore any lessening of maternal mortality and morbidity improves the prospects of infant survival.

The Mortality of the First and Second Years.

In the diminution of the mortality during the first and second years much progress has been made of late years especially in New Zealand. Infant welfare associations and infant clinics have disseminated a knowledge of mothercraft, which can be imparted only by education, with good results. But much more remains to be done. Speaking for Queensland only, I must remark that a great deal of the work of our clinics consists in trying to rectify the most elementary and obvious mistakes, that have been made in starting infants wrongly. We find a general ignorance among mothers and an amazing ignorance among midwifery nurses (there are brilliant exceptions). Breast feeding is the most important preventive of infant mortality during the first year, yet we constantly see healthy young mothers unable to suckle their infants owing to faulty management by nurses and medical men. Ultimately our profession is responsible for the errors of nurses who have never been properly trained, and are not properly supervised. In every midwifery school there should be at least one sister who has been through a course of training in infant management. She should be responsible for the welfare of the infants and for the training of nurses and mothers in mothercraft. When the mother leaves the lying-in hospital, she should be directed as a matter of course to attend the nearest infants' clinic once a week to have her baby weighed. When this becomes the rule and not the exception, our present wastage of infant health and life will be largely reduced.

The time has passed when the health of individuals was regarded as a purely personal matter. Its passing was hastened by the war; for then it became very evident that individual health was a matter which concerned the welfare of the State. The State is more especially interested in the health of the young, for this determines the vigour of the next generation of our race; the future is always more important than the present. By medical inspection

of schools and provision for necessary treatment of the physical defects discovered, the State, I am speaking more particularly of Queensland, has taken one step forward. By the provision of clinics for children under school age it is taking another. These clinics are nursing institutions and not primarily medical institutions. Their primary object is the prevention of disease, not its treatment. Their methods are educative. For their success three conditions must be observed. Their nurses should be of the right sort and thoroughly trained; they should have as much medical supervision and assistance as may be necessary; they should work in cooperation with the medical profession. The first condition has been fulfilled. At least in Queensland I can vouch for the quality of our nurses and the thoroughness of their training. There should be a medical director of the whole service and medical lecturers at the training school. My experience has convinced me that there should be a local medical man attached to each clinic. His duties are confined to one afternoon a week, when he sees children needing medical advice, whose mothers have no medical attendant. Those he sees amount to about 5% or 10% of the total number of children attending at the clinic. All children sent to the clinic by a doctor or known to have a medical attendant, are referred to him and not the clinic doctor. Without a doctor attached to the clinic, there is always a danger that the nurse will insensibly drift into treating medical conditions and this is bad for herself, for the clinic and for the public health and should be prevented. Cooperation with the medical profession is as yet imperfect and the fault lies partly with the profession. Our clinics will continue to do good work whatever happens; the desire of those connected with them is to work in harmony with local medical practitioners. Those doctors who send children to the clinics, will find our nurses a great help to them and will tighten their grip on their patients. Those who advise their patients to keep away from the clinics, may be assured that some of their patients will still go to them. They will conceal the fact from their medical adviser and will probably not inform the nurse that they are his patients. When, therefore, they need medical advice, she may direct them elsewhere. From a personal point of view he is acting unwisely. But I would ask him to look at it from a broader point of view. Both profession and clinics are concerned in the preservation of infant life; they can do much more in conjunction than in disunion.

The Mortality of Childhood After the Second Year.

The mortality during the second year of life depends mainly on the infections among which we must reckon not only diphtheria, scarlet fever, measles, whooping cough and tuberculosis, but also bronchitis and pneumonia. To discuss the possibilities of their prevention would take up too much of your time. Each disease would have to be considered separately. Diphtheria might probably be easily controlled by measures of immunization which we have been very slow to adopt.

At this age also many defects due to removable causes and enfeebling the general health, such as adenoids, are frequently observed at our clinics and are recommended for treatment.

PROFESSOR J. C. WINDEYER (Sydney) called attention to the importance of mothercraft teaching and the training of the obstetric nurse. The period of training of the obstetric nurse should be extended. One year was too short.

DR. H. COOPER PATTIN (Norwich) found satisfaction in the fact that in New Zealand where the British race was comparatively unmixed, the standards of development of children were high.

DR. CONSTANCE ELLIS (Melbourne) called attention to the value of early treatment of gonorrhoea, in order to prevent subsequent sterility. In this way the Fallopian tubes could be saved from infection.

DR. ADA PATTERSON (Wellington) disagreed with Dr. Harvey Sutton in regard to the value of swabbing of throats in diphtheria. She urged the employment of prophylactic treatment as practised in New Zealand.

DR. G. BRUTON SWEET (Auckland) spoke of the futility of closing schools in times of epidemics. He urged the establishment of open air schools. This was a preventive measure against the common cold.

DR. C. H. GORDON (Riverton) asked for information concerning sex education in schools. He pointed out the difficulties surrounding this subject. It was a matter for earnest consideration.

DR. H. L. STOKES (Melbourne) spoke of the care of ill-nourished children at Toronto.

D. A. M. WILSON, Dr. Harvey Sutton and Dr. Jefferis Turner replied briefly.

COMBINED MEETING—SECTIONS I. AND XII.

HYDATID ANAPHYLAXIS.

By H. R. DEW, F.R.C.S. (England),

From the Walter and Eliza Hall Institute, Melbourne.

In the literature of hydatid disease there are many references to the appearance of peculiar toxic manifestations following puncture or rupture of hydatid cysts. The most common of these is the so-called hydatid rash, characterized by irregularly distributed urticarial wheals, with general or localized erythema and pruritus. Other symptoms of variable occurrence are irregular pyrexia, dyspnoea, cyanosis, abdominal pain, vomiting, diarrhoea, syncope, delirium and mania. Profound cardio-vascular shock may dominate the picture and lead to a fatal termination.

It is only of recent years that these phenomena have been recognized as anaphylactic in nature. They were at first thought to be due to reflex action and were later attributed to the primary toxicity of hydatid fluid, a view that was supported by the observations of Roy⁽¹⁾ who found that the injection of sterile hydatid fluid caused lowering of the intravenous blood pressure and variation of respiratory rhythm. The later work of Bacigalupo and Grasso,⁽²⁾ Giusti and Hug⁽³⁾ and of Bryce, Kellaway and Williams⁽⁴⁾ has thrown further light on the pharmacological activity of hydatid fluid. A substance which according to the last named workers partakes of the character of ergotoxin rather than

of histamine, is present in variable amounts in some but not all samples of hydatid fluid. It is clear that very large amounts of fluid would require to be rapidly absorbed for symptoms to be produced directly in this way.

On the other hand the close resemblance between the clinical picture in these cases and that associated with anaphylaxis due to foreign protein, the presence of sensitiveness to hydatid fluid in patients with hydatid infestation and the precipitating and complement fixing activities of their sera together with the variable power of conferring passive sensitiveness by injection of such sera into suitable animals make it almost certain that the majority of these symptoms which follow rupture of hydatid cysts, are of anaphylactic origin.

A patient harbouring a hydatid cyst will absorb varying amounts of specific hydatid antigen. This absorption probably takes place most readily during the early stages of the development of the parasite before the impermeable laminated membrane is elaborated. The occurrence of the specific cellular response round the follicle favours the view that products of parasitic metabolic activity may then be diffused and at the same time, since the infection is doubtless often multiple, other embryos may be destroyed by the tissues of the host with the liberation of hydatid antigen. As a result specific sensitization of the cells of the host takes place and if at any later period even small quantities of hydatid fluid be absorbed into the circulation, anaphylactic symptoms of varying severity occur.

The degree of sensitization varies greatly, but that it is found even with uncomplicated cysts is shown by the positive results of the intradermal test of Casoni in over 90% of these patients. Gross leakage of hydatid fluid during the life of the uncomplicated cyst does not occur owing to the impermeable nature of the laminated membrane. The absence of specific eosinophile cells in the blood or in the surrounding adventitia and the frequency of the failure to obtain a response to the complement fixation tests in the patients support this contention.

Leakage may, however, occur spontaneously or as the result of trauma, puncture or surgical interference. There is no doubt that there are often small unnoticed leaks from deeply placed visceral cysts and the effect of such leakage will depend on the amount of fluid absorbed, on the rapidity of absorption and on the degree of sensitization. In some cases the only effect may be to produce desensitization, but in the majority anaphylactic symptoms, mild or severe, occur. Following the initial symptoms recovery is the rule, but after a period of two to three weeks the patient has again become sensitized, so that a subsequent leakage may be followed by even more striking manifestations. So sensitive do some of these patients become that the absorption of minute quantities of hydatid fluid may cause alarming symptoms, a condition which is well exemplified by the following case.

Mrs. N., the patient, had had three previous operations for hydatid disease and had had mild anaphylactic symptoms secondary to spontaneous rupture into the biliary passages. She attended for postoperative immunological tests. An intradermal Casoni test was performed, 0.25

cubic centimetre of sterile fluid being injected. Within an hour the patient's arm was swollen to the neck, she became dyspnoic, extremely cyanosed, collapsed and was admitted to hospital with oedema of the glottis. Her pulse was for a time imperceptible and it was thought that she was going to die. Adrenalin (0.3 mil of a 1% dilution) was given and she slowly recovered. For some days, however, she was extremely ill, her temperature ranging to 39.4° C.

It seems probable that if an accurate history were obtained in all cases of hepatic cysts containing daughter cysts, it would be found that the patient had suffered at one time or another from indefinite attacks of an obscure nature frequently associated with urticarial eruptions.

As has been already indicated the clinical manifestations of hydatid anaphylaxis are extremely variable. It is rare for all of them to appear in any one patient and as a rule they are arranged so as to form one of a series of diverse clinical pictures. The symptoms may be grouped according to the systems which are affected, as follows:

Cutaneous.—Pruritus, urticarial wheals, erythema, sweating;

Gastro-intestinal.—Nausea, vomiting, diarrhoea, tenesmus, abdominal pain, melaena;

Respiratory.—Tightness in the chest, spasmodic cough, dyspnoea, cyanosis, pulmonary oedema, oedema of glottis;

Cardio-vascular.—Pallor, faintness, tachycardia, clammy skin, cold extremities, syncope and collapse;

Nervous.—Agitation, convulsions, dilated pupil, delirium, coma.

In a series of twenty cases in which these manifestations have been noted and in three of which a fatal result followed rupture into the heart or pulmonary artery, the frequency of the various symptoms is indicated by the following table.

TABLE I.—FREQUENCY OF ANAPHYLACTIC SYMPTOMS.

Symptoms.	Frequency.
Cardiac disturbances	17
Dyspnoea	16
Pruritus	15
Cough	14
Urticaria	13 (7 delayed)
Cyanosis	10
Agitation	10
Vomiting	9
Abdominal pain	8
Pulmonary oedema	6
Dilated pupils	6
Delirium	3

Some of these symptoms may have been caused directly by the accident to the cyst rather than by the liberation of specific antigen. For instance, abdominal pain occurred in the case of liver cysts rupturing into a bronchus, into the pleura or into bile ducts and all other cases in which it was noted were examples of rupture into the peritoneal cavity. Similarly cyanosis and dyspnoea may in some cases have had a mechanical explanation as in the three cases of rupture into the heart or great vessels and in one case of rupture into the pleura.

Despite this it seems likely that most of the manifestations were anaphylactic and it is interesting to note the frequency of respiratory symptoms, pre-

sumably due to the contraction of the bronchial smooth muscle.

The Gravest Cases.

The gravest cases are those in which there is intravascular rupture or rapid absorption in highly sensitized subjects. In these symptoms occur characteristically within a minute or two. There is intense pruritus, dyspnoea, cyanosis, severe abdominal pain, syncope and collapse and a fatal result is common within twelve hours. Pulmonary and nervous symptoms usually predominate and the picture may resemble eclampsia with convulsions, delirium, mania and coma. Urticaria and erythema rarely occur in these cases. This type of case is rare, but several have been recorded even after puncture of a simple pulmonary or abdominal cyst. In spontaneous rupture of a pulmonary cyst death sometimes occurs. Lendon⁽⁵⁾ has pointed out that in some at least of these cases the *post mortem* signs of death resembled rather those of shock than of drowning asphyxia. It is, therefore, probable that anaphylaxis is an important factor in these fatal cases.

Thomas,⁽⁶⁾ Holden⁽⁷⁾ and Graham⁽⁸⁾ have recorded fatalities following puncture of a splenic cyst. In some cases it would appear that the exploratory needle punctured a blood vessel as well as the cyst, allowing direct intravascular leakage (Bryant⁽⁹⁾).

Severe Cases.

In typical severe cases, such as occur after puncture, rupture into a natural cavity or channel the onset is also rapid. Dyspnoea, collapse, nausea, vomiting and failure of the pulse followed by pyrexia for one to six days are the commonest manifestations. Urticaria may be entirely absent in the earliest stages or may not be observed at any time. When it does occur, it is often after thirty-six hours and then may lead to a retrospective diagnosis of the true nature of the disturbance. For some days remissions tend to occur and the patient's condition remains grave. This type of case is not uncommon and may occur after rupture into the pleura, as is exemplified by the following case.

Mrs. K., *etatis* fifty, had had six previous operations for hydatid of the liver, the first operation being fifteen years and the last three years before admission. At 9 a.m. on January 12, 1926, the patient experienced severe pain in the right side and shoulder, then great difficulty in breathing, became dusky, then intense itching of the skin, then became hot and cold all over, faint and had to lie down, then vomited several times and felt exhausted.

On examination extreme cyanosis was noted and the patient was in great pain. The pulse rate was 100, the respiration rate 30 and the temperature 38.8° C. No urticaria or erythema was noticed at any time; pyrexia occurred for some days when she gradually improved. Investigation revealed diaphragmatic distortion on the right side, lessened movement and hepatic enlargement.

At operation, an hepatic cyst containing daughter cysts was found with rupture into the right pleura. This was evacuated and drained and after a stormy convalescence recovery ensued.

In this case the patient had been sensitized by previous operative interference and the rupture into the pleural cavity occasioned rapid absorption of fluid and the onset of grave anaphylactic symptoms.

(To be continued.)

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